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THIS week, for the first time, the International Edition appears in its complete form, and we are now willing to consider the charges, complaints or criticisms of any subscribers to this edition who feel that we are not properly fulfilling the engagements made with them in our circular of announcement. Even during the hand-to-mouth period which has just closed, the mails have brought us practically nothing but expressions of unqualified approval of our conduct of the undertaking; and as we have usually succeeded in doing more and better than we promised, we have no great fear that many complaints will be entered against us during the balance of the year. Of one change we are now forced to make no one will complain. The amount of text we have added to all the editions and the increase of illustrations in the "International" is so great that the year's issue must be divided into four volumes. The "International" will be bound in four volumes; while the "Imperial," as hitherto, and now the "Regular" also will be bound in semi-annual volumes to the great benefit of those who have to handle them.

AS soon as we suggested to our subscribers the possibility of publishing this edition, we began negotiating for the procurement of independent supplies, but we soon found that so much time would be necessary to complete arrangements, while the doubtfulness of obtaining in this way satisfactory material was so great, that we were forced to change our tactics, as it was necessary to have the edition ready for the first of the year. The arrangements we at length made, have resulted far more satisfactorily than we hoped, particularly in the case of the London *Architect*, as this journal was already widely known to and easily procurable by American architects. The *Bauindustrie Zeitung*, a comparatively new journal, and one having no circulation in America, gave us no cause for doubt; and the same may be said of the *Moniteur des Architectes* which, although having a larger circulation than any other French architectural journal, has had practically no subscribers in this country beyond a few of the most important libraries. We feel that however our subscribers may look on the other foreign contingents, they should felicitate themselves on the arrangement made with the *Moniteur*, since the illustrations of that journal are copper-plate engravings, etchings and real photogravures of unquestionable quality and architectural interest. The illustrations in this edition are therefore produced through the agency of almost every process of reproduction known to the world of printers and bookmakers while as for the subject matter our four sources of supply cover representatively, if not completely, the fields of contemporary and historical work of the French, German, English and — shall we say — American Schools of Architecture. As to all the foreign illustrations it should be observed that before reaching us they have already been accepted for publication by the editors of architectural journals of the first rank and the ripe judgment and experience of these gentlemen give guaranty that the illustrations they furnish are surely no less valuable than any we might obtain from independent sources.

IN two points, however, the International Edition is not what it should be. Take up a copy of it and the inferiority to the foreign contributions of the American subjects "jumps at the eyes," as the French put it. But we assert that there is no need for, no excuse for, this saltatory tendency on the part of the specimens of American architectural design included in this edition. Whose fault is it? Not wholly ours, though we are, no doubt, to blame for not excluding some of the work, and in place of it sending out a blank page with the inscription "American architects cannot this week produce work to rank with that of their European brothers." Whose fault is it, then? Mainly the fault of the American subscribers to this edition, who selfishly prefer to seclude their designs instead of through their publication doing their fair share toward the general advancement of the art of building in this country. There is not, we believe, a single American architect of first-rate ability who does not subscribe to this edition; and as there are certainly enough of them to supply good and interesting American material for this edition, it is the fault of these indifferentists if American work fails to hold its own when placed side by side with foreign work within the same pair of covers. In another particular we are likely not to be able to carry out our provisional promise: so far as information on the point has been furnished us, there has been this year but one limited competition in the country. We at once endeavored to procure these designs, and, of course, encountered the usual formula "I don't want to, but if the others will I am also willing." Having got as far as this, the next move on our part was followed by the usual withdrawal of even this conditional assent. We have wearied flesh and pen-point for so many years in working round and round this circle that we have grown callous and indifferent, and have come to feel that if architects are, as they seem, entirely satisfied with the illustrations we place before them, why should we feel that we are not doing our whole duty toward them?

THE Master Painters' and Decorators' Association has issued some orders to architects, which they will, we suppose, hasten to obey, with the humility befitting members of the most long-suffering of professions. Realizing that architects do not have enough to do, and that time, during their office hours, hangs heavy on their hands, the judicious painters and decorators have ordained that they shall be "earnestly and respectfully" requested "in future to specify the sizes of glass." What good it would do the architect or his employer to specify the sizes of glass in his buildings, instead of letting those who aspire to the privilege of furnishing it measure the sizes on the drawings for themselves, we are not informed, but that the would-be contractors for the glazing might find it convenient to have the architect do a part of their work for them we can easily understand. The only wonder is that they do not ask him to do the whole. It would be still more convenient to have him figure up the number of boxes of each size, and trot around among the dealers to get prices for the contractors to use; and if he could be compelled, as the contractors actually undertook to demand in New York some years ago, to guaranty the correctness of his estimates, there would be hardly anything more to ask of him. Unfortunately for the prospect of realizing this bright dream, our architects are quite aware that their professional duty does not include the furnishing to contractors of any quantities or sizes whatever, other than what can be gathered from the drawings by the contractors themselves; that, if contractors wish for them, they can be accommodated in the proper way, by paying a quantity surveyor a reasonable fee, which is about half the

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architect's commission, to measure and tabulate them from the drawings and specifications; but that even professional quantity surveyors never guaranty their quantities, and have been legally held not to be responsible for the consequences of even very serious mistakes in them; while experience in England has shown that the furnishing of quantities to contractors by a surveyor does not lead to any more accurate estimating than with us, where this is rarely done. Moreover, as it is said to be customary with English quantity surveyors to add ten per cent for contingencies to their measured quantities, so as to protect themselves against any possible claims for deficient measurement, the owner, if the surveyor's quantities were made the basis of the tenders, would pay at least one-tenth more for his building than it was worth; and the more business-like English contractors are said, in consequence, to pay no attention to the surveyor's quantities, although, if they are awarded the contract, they have to pay for them; but to base their tenders already on their own measurements, just as is done here.

WE would like to call the attention of young architects and assistants to the notice of the examinations for the Rotch Scholarship, which appears in another column. The competition for this great prize has never yet been so active as it should be; and, although men of first-class ability and attainment have been sent out, the contest has usually been between half-a-dozen, instead of half a hundred, as it should be. Probably, as the history of the Scholarship grows longer, and the advantage enjoyed by the winners in their subsequent career becomes more generally known, the competitors will be more numerous, but, for the present, the aspirant for two years of study abroad, under the best possible auspices, has, if he is sure of having mastered the subjects on which he is examined, comparatively small odds against him in the main contest, while, of course, the effort itself is a great gain to all who make it.

THE Chairman of the United States Light-house Board has applied to the Secretary of the Treasury, asking that, in the bill authorizing the construction of the Hatteras Light-house, the provision of the general law in regard to the erection of such buildings, which provides that "no contract for the erection of any light-house shall be made except with the lowest bidder therefor," may be suspended, so that the contract for the new light-house, which is one of great importance, may be awarded, in the discretion of the Board, to persons other than the lowest bidders. The reasons which the late Admiral Rowan gave for this request will be interesting to architects. "In repeated cases," he says, "contractors have taken jobs at prices less than the Board has estimated that they could be done for, and while they have been held to their contracts by constant and skilled supervision, the Board has been fully satisfied that every effort was made by the contractors to slight the work that their loss might be lighter, and this, of course, has been detrimental to the character of the work." It will be observed that there is a singular difference in theory between the work of a light-house Board and that of an architect. While the latter is always presumed, by lawyers and jurymen, to be able by occasional visits, to secure the most perfect and skilful work from cheap and ignorant contractors, and is held pecuniarily responsible if he fails to do so, a light-house Board find it a matter of course that, even with "skilled and constant supervision," such as clerks-of-works, not architects, are paid to give, an inferior contractor cannot be made to do good work. The Admiral illustrated his point by saying that "in cases of building certain steamers, the lowest bidder was known to be an inferior workman, but the Board was forced to give the contract to him, and, though his work was supervised with more than usual care, the steamers were just good enough so that the Board could not refuse to accept them, and yet so poor that they have been quite frequently under repair." We need hardly say that lawyers, whose ideal architect, when they wish to extort money from one of the profession, is a being endowed with the eyes of Argus and the wisdom of Solomon, would hold up their hands in horror at the thought that work accepted by an architect should afterwards need repair, and, with the hearty support of judge and jury, would infallibly make the architect pay for such repairs; yet in the public service, with all the care that can be given, and with special and skilled supervision, the work done by cheap contractors is, as Admiral Rowan said, "of course" cheap and bad, and the Government, not the inspecting officer, pays for the repairs.

A GOOD deal of opposition has been shown by builders, and others interested in the improvement of real-estate, to the proposed increase of the duties on lime, cement, plaster-of-Paris, window-glass, brick, tiles, zinc and lead. We have no intention of entering into any discussion as to the merits of our protective system, in general, but it is obvious enough that an artificial increase in the cost of building, which means higher rents for every one, and the throwing out of employment of great numbers of mechanics, by the postponement or abandonment of building projects, ought not to be imposed upon the country without serious consideration. As we have often pointed out, the high price placed upon structural iron by the producers' combination is the principal cause of the inflammable construction of our great warehouses. American architects know, better than any others in the world, how to make fire-resisting buildings, but the advantage to owners, in rent, and saving in insurance, of erecting such buildings, is not sufficient to pay the interest on their excessive cost, and a very large part of the enormous annual fire-loss of the country is directly chargeable to the policy which gives nine rolling-mills a comfortable monopoly of the market for the principal fire-resisting-material. With the additional tax on the other materials mentioned in the list, the cost of the simplest houses would be considerably increased, and, as we think, all building would be checked in much the same way that fireproof building is now restrained. It ought not to be forgotten that the artificial heightening of the cost of buildings is a very different matter from the imposition of an extra duty on silk or woollen goods. These are rapidly worn out, and no one suffers serious loss as the price changes; but houses are built, not for a few months, but for generations, and an extra ten per cent added to the investment at the outset, through an artificial and perhaps temporary enhancement of the cost of materials, will count up, at compound interest, before the house has fallen to decay, to a sum which would pay the entire original cost of the building many times over. For this reason, prudent men take care not to build in times of inflated currency, or under circumstances which produce, as they think, a temporary increase in the cost of construction. If they have money to invest, they prefer to buy property not artificially magnified in value, and, in consequence, not liable to violent shrinkage when the circumstances change.

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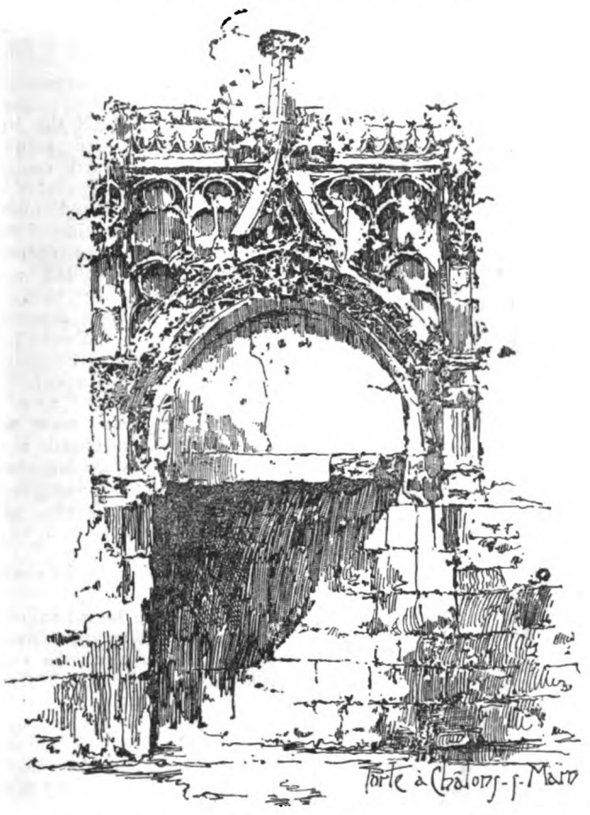

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It may, then, be said that private architecture is as old as the remotest civilization, and that, in all times as in all countries, it has been most largely the object of man's solicitude. We might also infer that it must naturally have served as the prototype of religious architecture, the temple of the god of the early ages being no other than the abode of man enlarged and adorned.

In fact, the first use made of the crude materials within man's reach was to build a shelter for himself. Then, by degrees, he shaped these materials in such fashion as not only to improve his shelter and the arrangement of it, but also to gratify his tastes and brighten his family dwelling. When he reared a temple to his god and a palace for his chief, he did nothing more than develop the principles of construction and decoration which he had put in practice in building his own habitation. Private architecture is, therefore, the starting-point of all architecture, and, in those countries where art at certain epochs was purely national and indigenous, we find in the public edifices enlarged reproductions of private architectural types.

We can, then, still discover in the monuments of ancient times a sure expression of the last civilizations, just as, for times nearer our own, private architecture reveals to us the inner life of the generations that preceded us.

When, however, instead of drawing its inspirations directly from the *milieu* which ought to fertilize it, monumental art takes its life only from old forms, whose *raison d'être* no longer exists, and whose meaning is distorted, it is to private architecture that we must turn to learn both the common yearnings of a nation and the peculiar genius of its artists and builders.

In fact, the works of private architecture reveal to us the inner life of peoples far better than do public edifices. The "monuments" of a nation, which are sometimes long in process of construction, and are the creations of several successive generations, are often only the expression of certain vague and not immediate needs. They satisfy wants of a general nature, or rather, they respond to those lofty and vague aspirations of the human soul, which, being as old as the world, are not a precise characteristic of any particular period. This is why we are as ready to admit the worship of divinity and prayerful communings into an edifice made after ancient designs as into one affecting the dispositions of the mediæval church.

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The habitation, in truth, shapes itself, like a shell, to the individual. It reveals to the historian and to the philosopher the secrets of the follies or virtues of a people, for, in the privacy of the homes, national tastes, inclinations and instincts are gratified without dissembling.

Public monuments are a nation's luxury; it feels its glory is at stake in their erection, and sometimes they are reared in pride for the eyes of posterity. They are, therefore, often a far less sincere reflection of a past age than are the modest constructions appropriated to the homely life of a corresponding epoch.

In their dimensions and grace of form, in the superiority and scope of the thought which presides at their conception, monumental structures may be considered as the poetry of the art of building; but private architecture is its prose — living prose — prose of a powerful realism, which daily delineates the features of individuals and passing generations.

It is, therefore, with as much respect as interest that we study the smallest fragments of the Asiatic or African, Greek or Etruscan civilizations. It is for this reason that we toil tirelessly amid the buried ruins of Herculaneum and Pompeii, which have told us more of the art and manners of their time than have all the grandiose remains of the monuments of Imperial Rome.

The place which private architecture has held in the past is most important. Its masterly productions are to be found everywhere: in the *châteaux*, in manors, and in the old habitations of the Middle Ages, as well as in the opulent dwellings of the seventeenth and eighteenth centuries; in France as in Italy and Spain, in Flanders as in Germany and England. These gems, great and small, form the endless chain which, adown the ages, links together certain immortal masterpieces which stand forth from point to point as resplendent symbols of an entire century, embodying its aspirations and enshrining its ideal.

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To private architecture, then, is entrusted the important mission of keeping the passion of art, as a sacred fire, forever inseparable from utilitarian obligations. But for this passion, but for a sort of exaltation toward a sought ideal, maintained even in responding to the homeliest needs, the architects who designed and erected the ancient dwellings, whose smallest remnants we now preserve with jealous care, would have been nothing more than builders. Instead of their charming creations, we should find only commonplace structures — mere shelters, simply answering the demands of necessity. It is private architecture whose multifold and incessant productions have kept alive the traditions of art and of the proper adaptation of local resources to good construction. On its works are trained the great majority of young architects, draughtsmen, skilled workmen and master-builders. Here proficiency is attained, here new designs are tried, and here experiments are made with new processes, and with the building materials which science and industry are daily multiplying. These experiments, repeatedly and judiciously tried, determine whether such processes and materials can be admitted to public constructions.

On the whole, then, this department of architecture furnishes a sort of experimental school, which is always open, wherein worthy traditions are preserved, where brains and hands are trained, and in which the boldness and spirit of initiative often render signal service to the building art.

We cannot here develop the special characteristics of private architecture among different peoples at different epochs of its history. The civilizations of ancient times have left us few examples of their home architecture, but judging of it from the merit of those monumental structures which have come down to us, we may assume the rationality and appropriateness of its various features. Without, however, going back so far, it will suffice to recall the fact that, during the Middle Ages, architecture in France proceeded, in public constructions as in private, on fixed and logical principles, which perfectly harmonized forms and decoration with the demands of utility.

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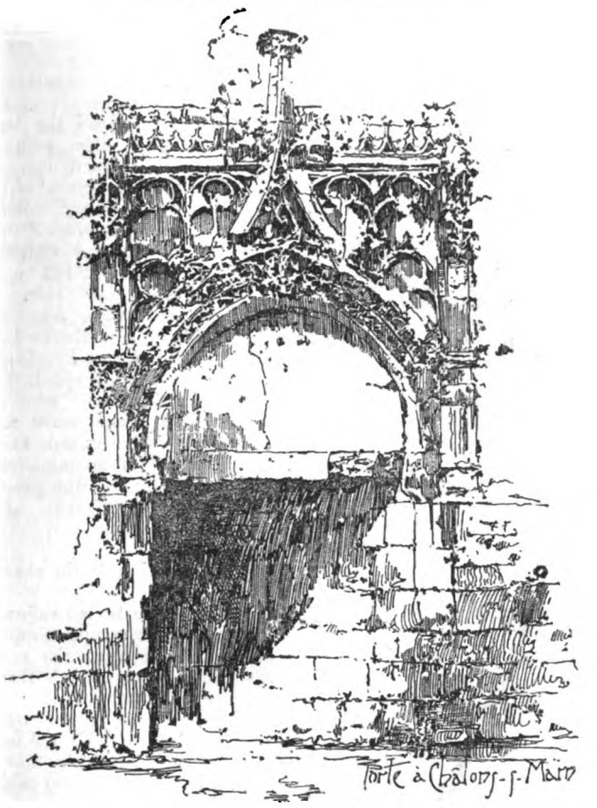

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During the Renaissance, forms and decoration assumed the ascendency over the expression of the needful, and art, freeing itself from the constraints of reason, became more capricious and more seductive. Later it took on a character of solemnity, yielding thus to the dominant taste for pomp; nevertheless, in its utilitarian dispositions, the manners of the period are found depicted. The architecture of the mansions and small dwellings of the days of Louis XV is stamped with characteristics at the same time trivial and rich. When France had been surfeited with the indulgence of her architects' fancy, an effort was made to gain distinction with delicacy of forms; as a result we have the constructions of the time of Louis XVI, which are so highly esteemed at present. In fact, their externals and their interior decoration appear quite in harmony with the elegant tastes of modern society. But they are still lacking in certain qualities of comfort which seem essential to us to-day.

The Directory and the Empire present an epoch of cold and narrow architecture, though not devoid of grandeur. The interiors yet guarded something of the refinement of the preceding period. But it was not long before the construction of dwellings, becoming a prey to speculation, neglected by artists and unheeded by the public, entered upon a period of decadence, which lasted down to the time of the great renovation of cities undertaken during the Second Empire.

Since then, it has assumed more and more interest and importance. After having been made for some time too subservient to the often fickle tastes of the public, private architecture is now taking on a well defined character, which will be in a happy fashion, a distinctive mark of the present epoch. By a complete revision of the plans of the modern house, by the logic of the general forms resulting from the necessities of the plan, by the accentuation of the means of construction employed, by the search after the picturesque, the consideration for detail, and the daily developing taste for coloring, private architecture is taking an important place in contemporary art.

Though, during long years, speculators have been putting up huge structures with monotonous, yet pretentiously rich, suites of apartments, the number of *hôtels* and small private houses has been recently increasing: these latter are being most advantageously substituted for the sumptuously commonplace flats piled one above another. As they can be infinitely varied to suit individual tastes and needs, the new art finds in them an especial field for development. To be sure, we see displayed in them a great deal of imagination and fancy borrowed from the art of the past, and even from that of foreign and distant lands. The architecture of the Middle Ages and of the Renaissance, and the rich or elegant dwellings of the last centuries have been largely drawn upon for the often ill-assorted elements of the city or country houses, the seaside or watering-place villas that abound in all frequented parts of France. But in this mass of different constructions, an essentially new character is declaring itself; this is based on logical research and on the emphasizing of truth in construction. The most inconsequential of the claims of contemporary architecture will certainly not be the claim founded upon this return to the healthy traditions of a construction which is not only logical and rational in its principle, but which is accentuated in the exterior mass and details, contributing, by the *mise en relief* of the skeleton, and, in some sort, of even the integuments of the edifice, to the expression of its useful functions and its moral character.

It is likewise in a measure due to these principles of sincerity that there is a gradual return to the use of exterior coloring for dwellings, a matter that has been much neglected since the end of the sixteenth century. Yet, up to that time, color had been from earliest ages universally the logical and requisite ornament of edifices.

Now that study and travel have revealed the ancient monuments set off by colors, as well as the mediæval structures and those of the Orient, we are gradually accustoming our eyes to the charms of the hues of enamelled clays or mosaics; they glow with a permanent brilliancy on the façades of our modern dwellings, and will ere long be essential to their adornment and gayety.

The fact must, then, be recognized that to our contemporary private architecture will also come the honor of that renaissance of monumental polychromy, the indestructible materials of which, such as bricks, marbles and enamels, will contribute to the perpetuation in a logical and sincere construction of the efforts of contemporary private architecture toward the realization of the beautiful in the useful and the true.

Paul Sédille.

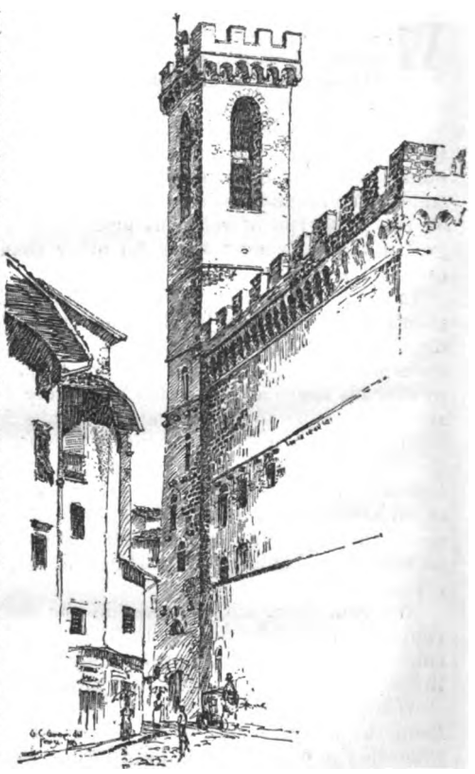
ITALIAN TOWERS. — I.

When the traveller southward emerges from the portal of the St. Gothard tunnel, he finds himself in a country as different from that left upon the other side, as does the American who disembarks from a Liner at Southampton or Liverpool. The mountains are as wild, the snow may be as near — or as deep, as the season may be — the guards about the station wear the same uniform, and there is no intolerable nuisance of custom-house and change of carriages; but the people, the houses and the churches, are all absolutely different. The traveller is still in Switzerland; he might almost as well be in Tuscany or Umbria for completeness of change.

And in no respect is the change more marked than in the change from spire to bell-tower which at once takes place.

The last little church-spire which he sees before he is swallowed up at Göschenen by the mountain, is of as distinct a type as one of the fair-haired Goths who sacked Rome. While upon the other side, at Bellinzona, perhaps, he will notice a tower which shows quite as plainly the influence of that same eternal city which nearly two thousand years of "Goth and Vandalism" have not destroyed.

It would be rash, perhaps, to say that the bell-tower is the most characteristic feature of Italy, there is so much in Italy that is absolutely Italian, so much that could by no possibility belong to any other country. A half-naked, ragged Italian asleep on the steps of the Campo Santo at Pisa, is a picturesque object. He is respectable, interesting and dignified — provided he doesn't beg. The same Italian in New York would be simply dirty and disagreeable — but in Italy he is one of the essentials. So are the olives, the donkeys, the stucco-houses, with walls of glaring white or Renaissance frescoes; the steep, narrow and twisting streets with their broad flat paving-stones below, and retaining arches and projecting eaves above. Perhaps these things in themselves are as characteristic as the churches and their bell-towers, and, at any rate, it is quite possible that the church and the bell-tower would suffer as much if torn from their surroundings, as does the Italian slumbering on his stone step in the sun at Pisa.



Fergusson, in his history of art and architecture, compares the Italian campanile with the tower of the North and finds much less merit in the former. There is but little sense of symmetry in the Italian tower, he says, and he objects that they are all top-heavy, and also to the fashion of horizontal divisions as breaking the unity of the tower.

If a tower must be ill-proportioned and "top-heavy" because it is no smaller at the top than at the bottom, then there is no doubt that the great majority of Italian towers are to be condemned at once, for rarely, if ever, does an Italian campanile taper. If belt-courses, at varied distances, sometimes marking the stories, sometimes purely for effect, are objectionable, then again most of the towers are bad. But these points must be points of purely personal taste. To some, Giotto's tower is beautiful beyond compare. To

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others it is the essence of foolishness set down — or rather up — in black-and-white. And each critic will prove to you beyond all doubt, that by all the laws of art and architecture he is right. To us the Italian campanile was ever more pleasing than the northern tower, and we looked often at it and sketched it whenever time and opportunity allowed.

It was at Lugano that we were first introduced to our towers of Italy, and a more beautiful place for the introduction can hardly be imagined. It was a warm November afternoon when we alighted

there from the Geneva-Milan express. The sun was sinking — going down into the great pile of Alps from which we had just come — coasted, I am tempted to say, for all the way down on the southern slope of the Alps, on the St. Gothard railway, there is a feeling that one is sliding — sliding and slipping down with a stop every now and then, lest the impetus should become too great. But we had just alighted at Lugano. Right below us lay the town with its half-dozen churches and their towers, and from each and all of them, sometimes in unison, sometimes one after another, came the soft peal of their bells. And it was not from the town alone but from a dozen others near by, little hamlets with a score or more of houses clustering each around its brown or gray tower with its answering bell.

The tower and the lake were all in shadow, but the tops of the mountains opposite were still in the wonderful glow of the sunset. Save for the bells it was absolutely still until the toy whistle of the outgoing Milan express broke out, and all the echoes in the Canton of Ticino started up and proclaimed themselves not to be quieted until the train itself was well on its way to Como.

I believe the country around Lugano is more thickly studded with bell-towers than any other section of Italy. They are not elaborate, but they give a singular beauty to the landscape. Straight and slender and square; sometimes with only a flat tile roof on the top, sometimes more elaborately terminated with dome or pyramid, cone or consoles, and always with one or more openings, the upper full of bells.

Perhaps our being strangers to Italy and her towers and churches made the little ones scattered about on the banks of Lugano especially striking, for we never afterwards noticed them particularly, and when we had been a week in Florence we had forgotten all about them. In fact, after we had been in Florence long enough to discover what there was there, we were rather inclined, in devoting ourselves to that city, to forget the rest of Italy for the time. Perhaps it was the knowledge that we were to spend several months there that gave us such a feeling of restful content, and within two weeks we had grown to look with satisfactory pity upon the be-field-glassed and Baedekered tourists who came into the Piazza del Duomo, and having gazed at the Cathedral, Giotto's Tower, the Baptistry and the Bigallo, inside and out, departed ten minutes after their advent. Sometimes a girl would come along with a Seaside Library edition of Ruskin's "*Mornings in Florence*," and another girl; and the two would spend twenty long minutes in alternate reading, and gazing at the tower. They were usually on their way to the old Franciscan Church of Santa Croce, there to study and exclaim upon the frescos once ascribed to Giotto, so that they generally gave up the tower after a hasty glance or two at Tubal Cain and Agriculture, and a few other of the panels in bas-relief upon its lower walls, and hurried on. It would be presumptuous to attempt to describe that tower — Ruskin has done that in his "*Seven Lamps*."

"The characteristics of Power and Beauty occur more or less in different buildings, some in one and some in another. But all together, and all in their highest possible relative degrees, they exist, so far as I know, only in one building in the world, the Campanile of Giotto. . . . In its first appeal to the stranger's eye there is something unpleasing; a mingling, as it seems to him, of over-severity with over-minuteness. But let him give it time, as he should to all other consummate art. I well remember how, when a boy, I used to despise that campanile, and think it meanly smooth and finished. But I have since lived beside it many a day, and looked out upon it from my windows by sunlight and moonlight, and I shall not forget how profound and gloomy appeared to me the savageness of the Northern Gothic, when I afterwards stood, for the first time, beneath the front of Salisbury. The contrast is indeed strange, if it could be quickly felt, between the rising of those gray walls out of their quiet swarded space, like dark and barren rocks out of a green lake, with their rude, mouldering, rough-grained shafts and triple-lights, without tracery or other ornament than the martins' nests in the height of them, and that bright, smooth, sunny surface of growing jasper, those spiral shafts and fairy traceries, so white, so faint, so crystaline, that their slight shapes are hardly traced in darkness on the pallor of the Eastern sky, — that serene height of mountain alabaster, colored like a morning cloud and chased like a sea-shell. And if this be, as I believe it, the model and mirror of perfect architecture, is there not something to be learned by looking back to the early life of him who raised it?"

But there are in Florence other towers which are not so unapproachable as this of Giotto's, for Florence in the Middle Ages was a city of towers, and a great number of those standing now were built upon the ruins of the older towers which perished from time to time in the broils and fires that the good citizens of Florence were continually starting. In 1248 the Ghibellines drove the Guelphs out of Florence, and having them well out, tore down thirty-six of the tallest of the towers. And they even tried to destroy the Baptistry, and ordered Niccola Pisano to do so by toppling the tower of Guardamorto upon it — a tower so-called because the bodies of the dead were exposed there for a certain time before burial. Niccola Pisano, however, not wishing to destroy the Baptistry, took out the stones upon the side toward the piazza, put in wooden supports and set them on fire. And the tower fell across the piazza and was set down as an act of Providence, and a special miracle of St. John, under whose patronage the Baptistry was and still remains.

But few of these towers remain now, and of the old "tower-houses" of which there were so many in Dante's time, there are only one or two left in Florence. In Prato where we went one day to see the Cathedral and outside pulpit of Donatello, we found a large number of them. They are probably one of the earliest forms of tower in Italy, and are nothing more than massive towers of stone, with small windows in the lower stories, and often a small *loggia* at the top, covered with a simple shed-roof of tiles. They are usually twenty-five or thirty-five feet square, and vary in height from fifty to eighty

feet. In Prato they are frequent enough to give the town a very distinct character. The campanile there, by-the-by, is well worth seeing. It suggests several of the Florentine ones,—a very natural sequence, for Prato was, until early in the sixteenth century, under the rule of Florence, and enjoyed her artists more or less. Giovani Pisano designed in great part the Duomo, and the tower was the work of Niccola di Cecco. It is of the same black-and-white marble as the tower in Florence, but the use of the colors in a decorative way is strictly confined to horizontal stripes after the manner of the Siena Cathedral, while the pilasters on the corners, and the upper openings show a humble imitation of the Florentine masterpiece.

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Of all the public buildings in Florence, the Bargello is perhaps as characteristic of the city as any. In the heart of Florence it stands, now converted into a national museum, and one of the most interesting buildings, apart from its architecture, in Florence. It was built as the palace of the Podestá, who with his successors occupied it until the office was abolished by Cosmo I. It is a huge building, massive and square in appearance but a rhomboid in plan. The walls are heavy and thick, four or five feet through at their base, of rough, unhewn stone, those of the lower stories large — huge blocks in many cases — and those above, smaller and laid in irregular courses. The tower is much the same. It seems to be a direct outgrowth of the old "tower-house," slightly modified to fit its purpose better. Built probably about 1260, it is the genius of the age which conceived it. It is heavy, gloomy, and to a certain extent forbidding. It may be said to be absolutely devoid of ornament, yet it has its strong points in design as well as construction. The batter of its lower walls adds to the effect wonderfully, and the courses of ashlar, of stones which are of all sorts of grays and browns and reds, make it rich and warm. The small windows below tell of a time when large openings were more to be feared than darkness or dampness, and the large and generous arched opening at the top lightens the whole tower at once. In it hangs the bell called by the people, "La Campana dell' Armi," which sounded as a signal for all good people to lay down their arms and disperse.

It is a curious fact, by-the-by, that the two civil towers, the Bargello and the Vecchio, which carried each their tocsin bell, one for the gathering, the other for the dispersing of its citizens; should have almost absolutely open belfrys, while the bells in all the church-towers are more or less enclosed. Was it that the Florentine was more ready to hear the former than the latter? The history of Florence would seem to bear out this theory. The fact that the Vecchio bell, which rang the summons to arms, is far more exposed than the Bargello, is also significant.

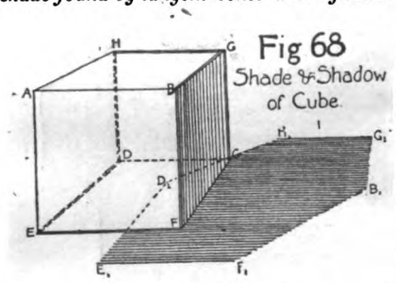
The parapet of the tower with its square merlons bears testimony to its Guelphic origin. All of the upper portion of the building has been restored and very well restored. Once the walls of the tower were partly covered with frescos, but they are all worn away now—and it is much better so, to the American eye at least. The only bit of artificial color is far up under the corbelling which bears the parapet, where the cross and the lily of Florence are emblazoned. The architect of the greater part of the building was Arnolfo di Cambio, and probably the tower itself is to a great degree his. Though as I said before, it is far more typical of the age in which it was built than of the style of any one man. George Clarence Gardner.

[To be continued.]

ARCHITECTURAL SHADES AND SHADOWS.[1] — VIII.

CHAPTER VII.

Shades and shadows of right-line solids; cubes, principal and oblique; sides in shearing light; square prisms and parallelopipeds; octagonal prisms; side in highest light; cylinders. Pyramids, square and octagonal; cones and abridged methods for locating line of shade upon them. Solids of revolution with convex profiles; line of shade found by tangent cones and cylinders; the spindle and torus.



86. THE geometrical solids most frequently occurring in architecture are the cube and its next of kin, the square prism and the rectangular parallelopiped. Then come the octagonal prism and the cylinder, and finally the pyramid, square or octagonal, and the cone, all of which appear frequently in roofs and spires. All of these solids, which form the subject of the present chapter,[2] are generated by straight lines, their lines of shade being therefore comparatively simple. The sphere, torus and spindle are considered incidentally as derivatives from the cylinder and cone, but the detailed discussion of these, as well as of balusters, vases and other solids of revolution is reserved for later consideration.

87. In architecture the above solids generally present themselves in what we have called "principal" positions, in which their axes

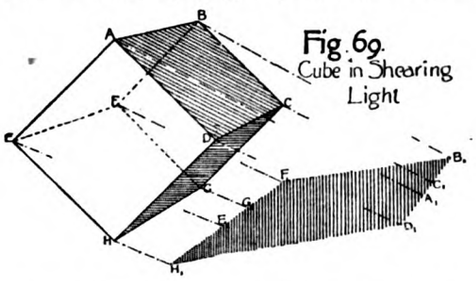


Fig. 69.
Cube in Shearing Light
Sides ABCD and EFGH, in shearing light. AB and AD cast shadows in same straight line; as also EF and EH. Shadow of cube becomes quadrilateral

are principal lines, and one or more of their faces principal planes. But in certain cases, such as that of the cube set cornerwise, of

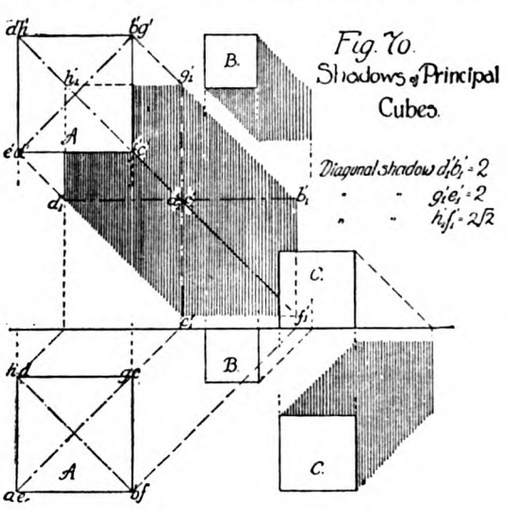
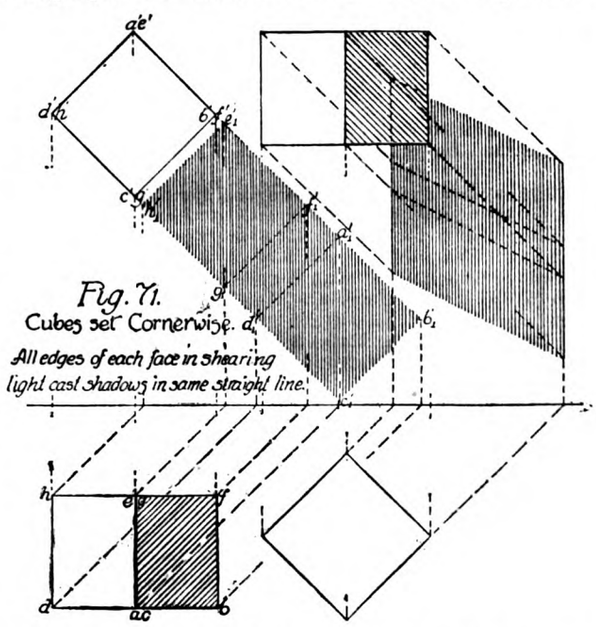


Fig. 70.
Shadows of Principal Cubes.
Diagonal shadow d'b' = 2
" " g'e' = 2
" " h'f' = 2√2
Cube A casts Shadow on VP. Shadows of its diagonals are h'f', g'e', d'b', and the point a'c'. Cube B in contact with VP. hides part of its own Shadow. Cube C casts its Shadow on HP in the same way. Height g'e', and width d'e' of Shadow each = twice the edge of Cube, or 2.

octagonal prisms or of pyramids, one or more of the faces may be in shearing light. The shadows of such faces on the plane of incidence are *straight lines*, and the whole face really forms a part of the line of shade.[3] For the sake of convenience, however, we may



[1] By A. D. F. Hamlin, Assistant Professor of Architecture in the School of Mines, Columbia College. Continued from page 57, No. 735.

NOTE. — [In view of the inconvenience of having to refer to back-numbers for explanations of the notation used in these papers, the following memorandum will be found of service.]

HP = horizontal plane of projection; $V'P$ = vertical plane of projection; GL = ground-line or horizon. Capital letters designate points and lines in space, small italics their horizontal projections, and the same accented or "primed," their vertical projections. Subscript figures indicate points of shadow: small figures above the line indicate points of shade. Greek letters (α, β, γ, θ, δ,) designate angles. The *diagonal* of a line or dimension is its length multplied by $\sqrt{2}$. Shadows are indicated by vertical shading; shades by horizontal shading; shearing light by oblique shading parallel to the projections of the luminous ray.

[2] It is impossible in a single chapter to discuss or even to illustrate by figures all possible variations in the form and position of these solids, and of their shadows and lines of shade. Only the most important and frequently occurring of these variations can be noticed; others which will at once suggest themselves will furnish opportunity for precisely that individual study and practice in shadow-casting which is most valuable and stimulating to the student.

[3] See Article 21 in No. 690 of the *American Architect*.

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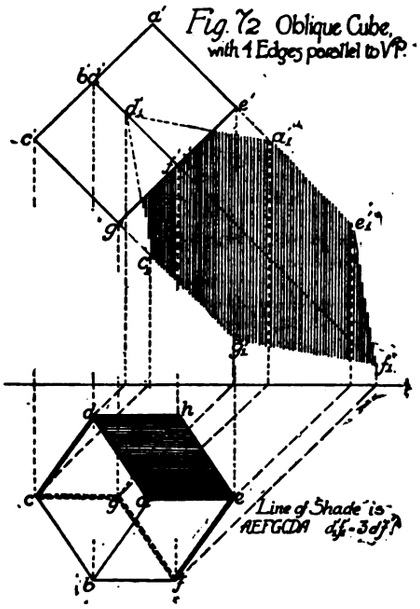
consider only those edges which separate such faces from the adjacent faces in light as really belonging to the line of shade. The effect of bringing any of the faces of a solid into shearing light is to reduce the number of sides of its shadow: thus the shadow of a cube, which ordinarily is six-sided (Figure 68) becomes a parallelogram when any two of its sides are in shearing light, as shown in Figure 69. Figure 76, *A*, shows an octagonal prism so placed that both of its bases are in shearing light; its shadow is thereby changed from the decagon of Figure 75, *D*, into a rectangle. Such cases are frequent; the oblique sides of bay-windows and octagonal turrets, the slopes of roofs and the sides of obliquely projecting wings furnish familiar examples of the phenomenon, whenever the angle is 45°, or the plane any one of the innumerable planes having one element parallel to the rays of light. Such surfaces, being neither in light nor in shadow, are half-tinted, and may have shadows cast across them.



88. The line of shade of the cube, generally speaking, is composed of six of its edges, separating three light from three dark faces; its shadow is, therefore, generally a hexagon, irregular, but with its opposite sides respectively equal and parallel (Figures 68, 70, 72). The only exception is that of the cube set cornerwise, bringing two or four of its faces into shearing light; the shadow then becomes a rectangle or a parallelogram, as in Figures 69 and 71.

88 *a*. As the cube in architectural drawings is most frequently bounded by principal planes, it is worth while to call attention to its shadow by rule.

(*IX*) — *The principal cube casts upon either coördinate plane a hexagonal shadow bounded by two horizontal and two vertical lines, each equal to the edge of the cube or to* 1; *and by two oblique sides at* 45° *to G L and equal to* $\sqrt{2}$.

Of its four diagonals, one is parallel to the rays of light, and its shadow is, therefore, a point;[1] another casts a horizontal and a third a vertical shadow, these two being each equal to 2; while that of the fourth is a line at 45°, and equal to $2\sqrt{2}$ or $\sqrt{8}$; these respective lengths are figured in Figure 70. It will be noticed that the width and height of the shadow of the cube are each double that of the cube itself. When, however, the cube is set *against* the plane of incidence, the width of the *visible* part of its shadow is precisely that of the cube itself; this is the way in which the cube oftenest occurs in architectural plans and elevations.

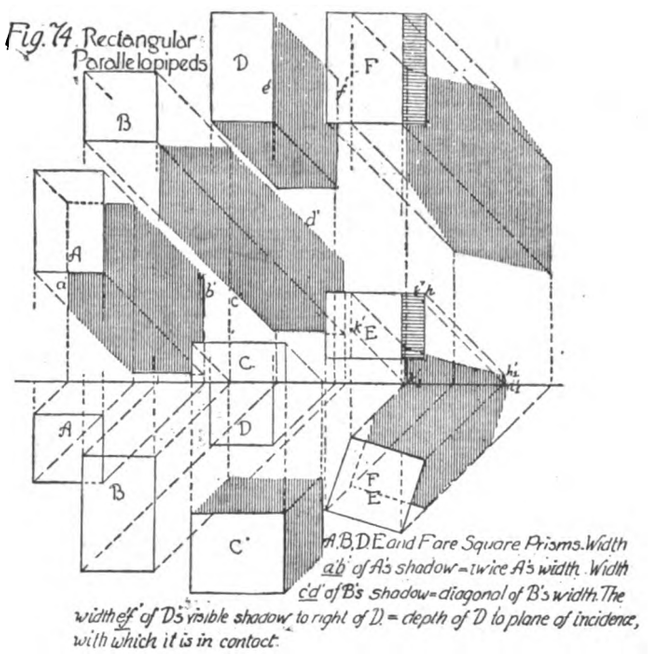
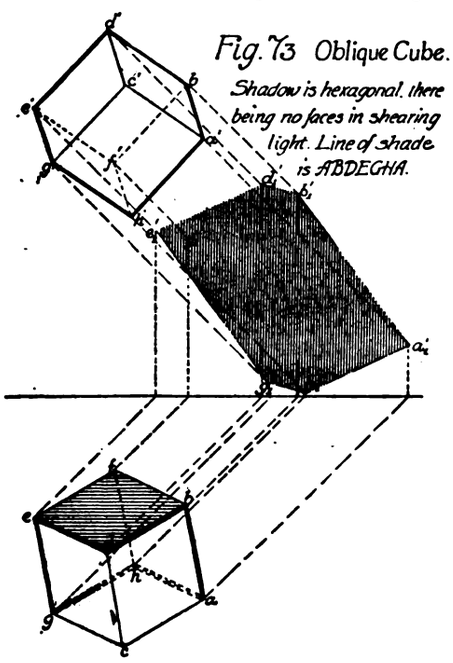


Fig. 74 Rectangular Parallelopipeds
A, B, D, E and F are Square Prisms. Width a'b' of A's shadow = twice A's width. Width c'd' of B's shadow = diagonal of B's width. The width e'f' of D's visible shadow to right of D = depth of D to plane of incidence, with which it is in contact.

89. Figure 71 illustrates the shadow of the cube set cornerwise, two opposite faces thus becoming "lozenges," in one case parallel, in the other perpendicular, to the plane of projection and of incidence. In the first case the shadow is an oblique rectangle, in the second a parallelogram. The dimensions and inclinations of their several sides are sufficiently indicated in the figures. When all the faces of the cube are oblique, its shadow may be found by casting the shadows of three or four of its angles, or of six of its edges. The required



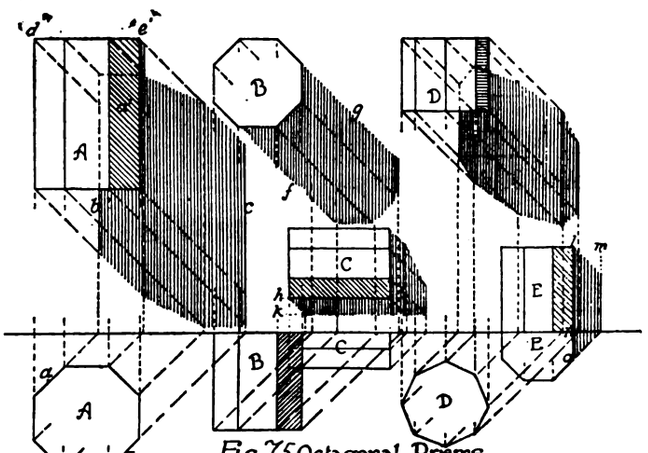


Fig. 75 Octagonal Prisms.
A casts shadow on VP: two faces (a a. a') in shearing light: width bc of its shadow = diagonal of width de of Prism. Width of B's shadow (fg) = width of B itself. C = half octagon against VP: hk = ½ side of octagon. E = semi-octagonal bay: width lm of shadow = width no of side normal to plane of incidence. Part of E's shadow falls on ground. D has no side in shearing light.

[1] At the intersection of the shadows of the other three, since all four diagonals intersect in a common point.

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outline is completed by applying the principle that shadows of opposite edges are equal and parallel (Figures 72 and 73). Cubes so situated rarely enter into architectural drawings.

90. *The rectangular parallelopiped* may be considered as formed by lengthening or shortening equally one or more sets of four parallel edges or four consecutive sides of a cube. Its shadow differs from that of the corresponding cube only in the length of its sides, but not in their direction. If each of the edges forming its line of shade be taken in turn as unity, the proportionate length of the shadow of that edge will be that given in the rule or in the figure for the cube in the same position. The form and proportions of the shadows cast by parallelopipeds in several of their most frequently-occurring positions, are illustrated in Figure 74. In this figure *A*, *B*, *D* and *F* cast their shadows on a vertical plane and *C* on the ground. *E*, under *F* and having the same plan, casts its shadow partly on the ground and partly on the vertical plane, which must receive whatever portion of the shadow does not reach the ground in front of it. It is important to notice which parts of the line of shade cast respectively each of these two portions of the shadow; the process of identifying each section of the line of shade with its particular shadow, and *vice versâ*, has already been explained in Chapter VI.[1]

91 In the case of square prisms (which are simply a variety of rectangular parallelopipeds, and types of all square towers and piers), the width of the shadow may be stated in the form of a rule as follows:

(*X*)—*The width of the shadow of a square prism, having its axis parallel to the plane of projection, and perpendicular to the other plane, is double that of the prism. When the axis of the prism is perpendicular to the plane of projection, two of its sides being parallel to the other plane, the width of the shadow is the diagonal of the width of the prism. When the prism stands against the plane of incidence, it covers a part of its own shadow; the width of the remaining and visible portion is equal to the depth of the prism.*

92. Cubes and rectangular prisms, both square and oblong, are to be met with occasionally in architectural drawing in other positions than those embraced in the above rule. In such cases the shadows have to be worked out in the same way as indicated for the cube in Article 89, and Figures 72 and 73.

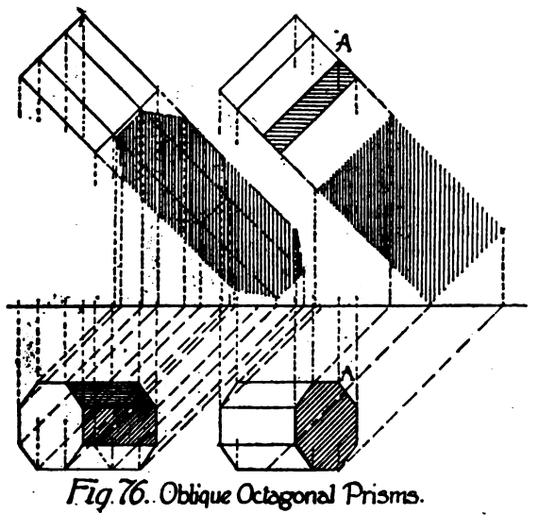

Fig. 76. Oblique Octagonal Prisms.

The axes are parallel to V.P. A has its two bases exposed to shearing light reducing its shadow to a rectangle.

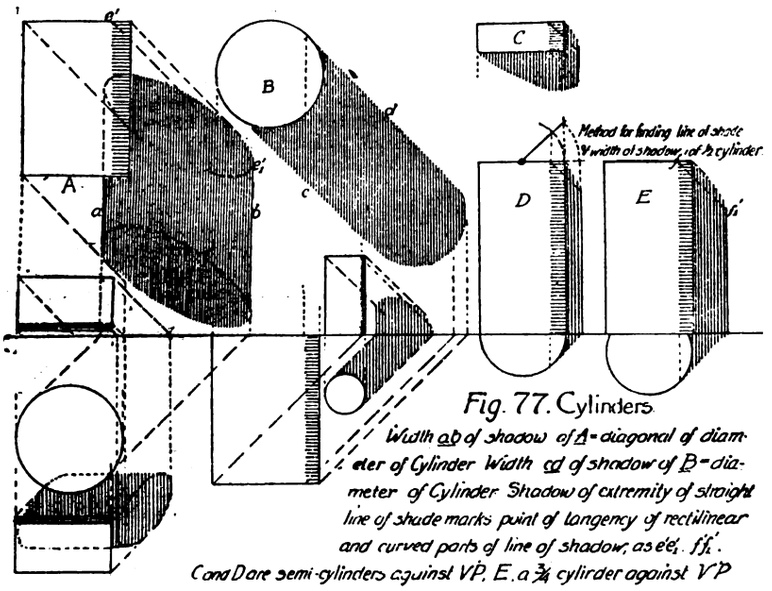

Fig. 77. Cylinders.

Width ab of shadow of A = diagonal of diameter of Cylinder. Width cd of shadow of B = diameter of Cylinder. Shadow of extremity of straight line of shade marks point of tangency of rectilinear and curved parts of line of shadow, as e e', f f'.

C and D are semi-cylinders against V.P. E a ¾ cylinder against V.P.

It will be seen that wherever there are no faces in shearing light, the line of shade is composed of two sides of opposite half-bases, and the two edges connecting these together; exactly half of the whole surface being in light.

93. This is, indeed, true of prisms in general having an even number of faces, with only the obvious modification required by the number of sides bounding each half-base. In the case of prisms having an odd number of faces, either more or less than half of the whole surface must be in light; the line of shade can, however, generally be determined by inspection, and it is then seen that it always takes in those sides of one base which correspond to those it leaves out in the other. But prisms with an odd number of sides are rare in architecture, the octagonal prism coming next in importance to the square prism and parallelopiped.

94. *The octagonal prism* generally appears with a vertical axis, as in the case of octagonal towers and piers, and the drums of octagonal domes, while semi-octagonal prisms are nearly or quite as frequent in bay-windows, oriels, apses, and similar masses. Their shadows upon vertical walls are easily obtained by casting the shadows of the two opposite half-bases and connecting these by two lines parallel to the axis of the prism (Figure 75). The shadows they cast upon the ground are even easier to draw; the bases being parallel to the ground, cast shadows equal and parallel to themselves, connected by two parallel lines at 45° to *G L*, (which is also the direction of the shadow of the axis perpendicular to the ground). Precisely similar, but necessarily changed in direction is the shadow upon the vertical plane of a prism whose axis is perpendicular to that plane (Figure 75, *B*). The octagonal prism almost invariably appears in architectural plans and elevations, with two faces parallel to the picture-plane and two perpendicular to it, the other four being inclined to it at 45°; two of these are consequently in shearing light; this is evidenced by the fact that the shadow of one side of each half-base coalesces with one of the two parallel lines which bound the whole shadow laterally. It is only when the prism is placed so that *all* its sides are oblique to the plane to which its axis is parallel, that the phenomenon of shearing light disappears (Figure 75 *D*). But this is an altogether exceptional position.

(*XI*)—*a. The width of the shadow of an octagonal prism which has its axis and two sides parallel to the plane of projection, and perpendicular to the other plane, is equal to the diagonal of the diameter of the prism.*

b. When the prism has its axis perpendicular to the plane of projection (two of its sides being parallel to the other plane), the width of its shadow is equal to its own diameter.

c. The width of a shadow of a half-octagonal prism planted against the plane of incidence (its axis being a principal line) is equal to the width of the half-face perpendicular to that plane (Figure 75, *C* and *E*).

95. In each of the three principal positions of the octagonal prism one of the oblique sides is opposed directly to the rays of light, and is, consequently, more brightly illuminated than those adjacent to it: it is called the "brilliant side," or side in high light. Opposite to it is the middle one of the three sides which are in shade: this is not, however, necessarily the darkest of the three, owing to the constantly varying conditions of reflected light. In a well-rendered drawing, the three visible sides of such a prism comprise one brilliant side, one side in medium light and one in shearing light. When the prism is turned so as to show four sides, an arris replaces the brilliant side, which disappears; this arris separates two sides in ordinary or medium light. Next comes a side faintly illuminated, but not quite in shearing light, and, finally, one side in shade. However slight the differences between the luminosity of the various lighted sides may be in the actual object, it is customary and proper in an architectural drawing to vary considerably the tint or the intensity of the color of the various sides, in order to express distinctly their varying relations to the picture-plane and to the direction of the light.

96. The shadows of oblique, triangular and hexagonal prisms, and prisms in special and unusual positions, the inquiring student can easily work out by finding the shadow of each solid angle whenever the line of shade is not obvious.

97. *The Cylinder.* As the shadow of the circle is easiest derived from that of the octagon, so the shadow of the octagonal prism leads naturally to that of the cylinder, which is bounded by the shadows of two opposite half-circumferences of its bases, connected by two tangents parallel to the shadow of its axis. These tangents are shadows of two elements of the cylinder 180° apart on its surface, and, when the axis of the cylinder is a principal line, constitute two of its "corners"[2] (as they have been called for convenience). Another of the four "corners," midway between these and on the front or visible half of the cylinder, is the brilliant element; that is, the line

[1] No. 718 of the *American Architect.*

[2] See Articles 61 and 62, and Figures 50 and 53, in No. 706 of the *American Architect.*

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in which the axial plane of rays cuts the surface of the cylinder, and corresponds to the brilliant side of the octagonal prism (95). In all essential properties the shadow of the cylinder corresponds to that of the octagonal prism, having the same relative extreme dimensions for corresponding positions, with the one exception that revolving the cylinder about its axis does not affect its shadow at all, while the shadow of the octagonal prism is within narrow limits altered in outline by any rotation of the prism on its axis.

(*XII*) — *a. The cylinder whose axis is a principal line parallel to the plane of projection has for its line of shade two opposite half-circumferences of its bases connected by two elements occupying opposite "corners" of its surface. Its shadow is bounded by two half-ellipses (shadows of two opposite semi-circles) and by two tangents parallel and equal to the axis of the cylinder. The width of this shadow is the diagonal of the diameter of the cylinder.*

b. When the axis is perpendicular to the plane of projection, the shadow is bounded by two opposite semicircles equal and parallel to the half-bases of the cylinder, and by two tangents at 45° to G L equal to the diagonal of the axis. The width of the shadow is equal to the diameter of the cylinder.

98. The first part of the above rule serves for the casting of all shadows of columns and circular piers and towers, whose shadows on a vertical plane should, therefore, always be given a width equal to the diagonal of the diameter of the shaft, pier or tower. The shadows they cast in plan on horizontal planes come under the second part of the rule, as also the shadows of discs, archivolts, etc., projecting from the face of a building in elevation.

99. The width of the visible shade on a principal cylinder parallel to the plane of projection is equal to the $R \times$ *Versin* 45°, R being the radius of the cylinder. If $R = 1$, this width becomes *Versin* 45° = .2929. Figure 77, *D*, shows the simple geometrical operation required to find this width; in other words, to locate the corner of the cylinder.

100. The width of the visible shadow of a semi-cylinder projecting from the plane of incidence is $R\sqrt{2} - R$. The distance of its outer edge from the axis of the cylinder is $R\sqrt{2}$, or simply $\sqrt{2}$ when the radius is unity. Figure 77, *D*, shows how this dimension may be obtained by means of the same diagram used in finding the corner of the cylinder. When more than half the cylinder projects from the plane of incidence, *add* to this width the distance from the axis of the cylinder to the plane of incidence. In the case of engaged columns, this distance is commonly half a radius, which enables us to cast the shadow of an ordinary engaged column in elevation without having recourse to the plan or section. Figure 77 shows the shades and shadows of cylinders in all the principal positions, and in Figure 78 are presented examples of the cylinder in

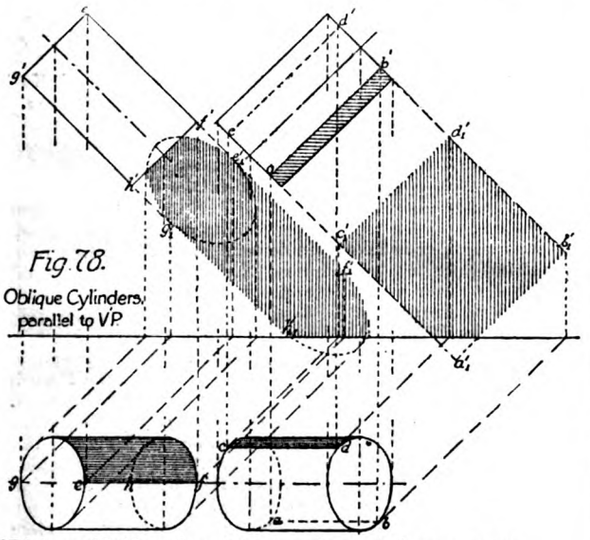


Fig. 78.
Oblique Cylinders, parallel to V.P.

EF, GH, and AB, CD, are lines of shade on B and A, found by means of their shadows, which are the rectilinear parts of the lines of shadow.

oblique positions, its bases being circles perpendicular to one plane and inclined at 45° to the other.[1] In these and other unusual positions of the cylinder, the location of the right-line elements of the line of shade is not always obvious, and must be learned from the shadow by the "reverse process." A somewhat singular result is obtained in the case of the cylinder whose axis lies in the direction of a ray of light. The whole curved surface of the cylinder is then in shearing light, and (the tangents connecting the shadows of the two half-bases being reduced to points) the shadows of the two bases coalesce in one ellipse, which is the shadow of the whole cylinder.

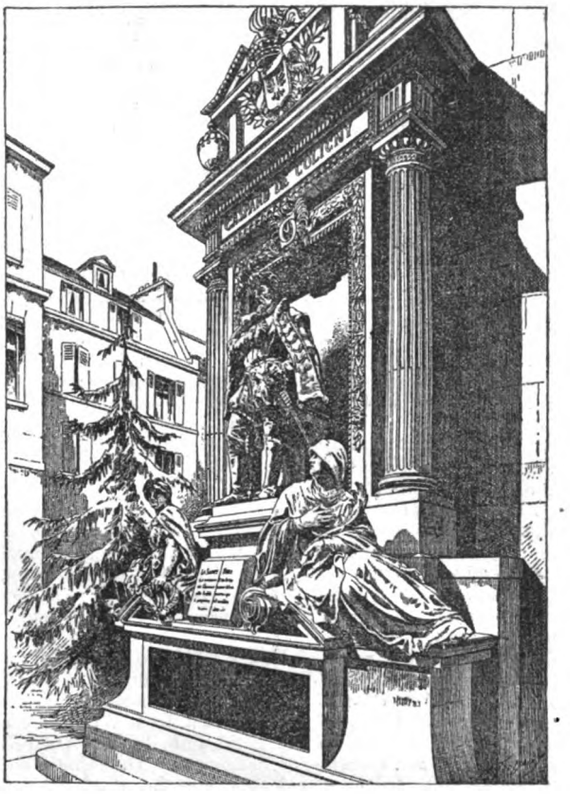
101. The importance of a thorough familiarity with the shade and shadow of the cylinder in its most commonly occurring positions is evident when we consider how large a part it plays in architectural form. Not only do we meet with it constantly in towers and turrets, in columns and shafts, in bay-windows and oriels, and in circular pediments, but it forms the chief generating element of most mouldings. The hollow cylinder, which is most familiar to the architect in the shape of soffits of arches and vaulting-surfaces, is reserved for later discussion among those forms whose shadows are partly cast upon portions of their own surface.

[To be continued.]

[1] The shadows cast by circles lying in principal diagonal planes have not been discussed in these papers. They can be easily found by means of the shadows of the circumscribed octagon, or by casting the shadows of several points in the circumference of such a circle, or of several of its diameters, and drawing an ellipse through the points thus obtained. To investigate and to state in clear and concise language the proportions and properties of the resulting ellipse, and the direction of its axes, constitutes an intellectual exercise of the highest value, besides giving excellent practice in the geometry of shadow-casting.

THE TUDOR EXHIBITION.

PORTRAITS.



THE idea of having exhibitions illustrative of certain dynasties, by means of portraits, relics and other personal belongings, is very happy. The first of the kind was one of the House of Stuart, to which the face of Mary, Queen of Scots, gave the chief charm; this spring we have the House of Tudor delineated, principally by Mabuse, Holbein, Guillim, Stretes and Zucchero.

The exhibition may be said generally to comprise portraits, relics and armor, the arrangement being in chronological order, beginning with the reign of Henry VII, 1485, and ending with the close of that of Elizabeth, 1603.

In the five hundred portraits we have what may well stir the spirit of an Anglo-Saxon, for they are those of the men and women who helped to make our modern English history at the glorious epoch of the European awakening, when doughty deeds were done on sea and land, and to some of whom we owe the establishment of many famous colleges and schools still flourishing.

But of almost greater interest than the portraits are the numerous relics, such as articles of dress, locks of hair, love-tokens, books, letters and medals. Who, for instance, can look unmoved at the ermine tippet worn by poor Anne Boleyn at her execution and stained with her blood; Miles Coverdale's English Bible, the first complete translation published in England; Henry VIII's "Defence of the Seven Sacraments," for which the Pope rewarded him with the title — still borne by our sovereigns — of "Defender of the Faith"; Wolsey's Cardinal's hat; and the baby-clothes made by Princess Elizabeth, for the expected child of her sister Mary and Philip II, that never was born, and thus probably saved England from becoming a mere appanage of the Spanish crown?

To begin with the portraits, we cannot fail to be struck with the alertness of mind manifested in the faces of both men and women, which certainly was all needed as is shown by the fact, that, out of eighty-one persons here depicted, eighteen were imprisoned, and nine executed for treason in the first two reigns. Except, in a few

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instances, there is great inequality of skill in the earliest portraits; the hands especially striking one as being nerveless.

The first portraits in the collection are those of "Margaret Beaufort, Countess of Richmond and Derby," through whose marriage with the son of Owen Tudor and Katherine of Valois — widow of our Henry V — her son Henry claimed the throne of England. All are by unknown painters: those taken in early and middle life show a fair degree of artistic skill and finish; the face is winsome and vivacious, as we should expect to find in so accomplished a woman; but in three faded portraits, painted when she was older, she looks austere and cold. These, evidently by another hand, were presented by the Countess to Christ's and St. John's Colleges, Cambridge, of which she was the Foundress.

Passing on to Henry VII, we have his celebrated portrait, by Yan de Mabuse; life-size, half length; he wears a crimson vest, rich ermine-lined robe, fastened by a richly-jewelled clasp, surcoat lined with sable, black cap with jewel. It is inscribed, on the background, with the King's name and that of the artist, with the date, omitting, however, what many have, the age of the person represented.

The upper part of the face is clever, but cannot atone for the crafty, cruel mouth, drawn down at the corners; it is avarice personified. Though a splendid portrait in every detail, either his own vices, or the painter, made him look fifteen years older than he was even at fifty-five when he died. Mabuse, however, did not paint him from life, being only ten years old at the King's death; he was, in fact, a contemporary of Holbein, who succeeded him as court-painter to Henry VIII, but whom he survived. In his hard-looking "Marriage of Henry and Elizabeth of York," no one seems to have anything to do with any one else in the picture. In full regal attire stands the unwilling and ungracious-looking bridegroom, accompanied by a bare-headed ascetic, with a rapt expression, holding a cross, thought to be the Cardinal Archbishop Bourchier, who pronounced the nuptial benediction; opposite them stands the buxom Princess, wearing a white dress brocaded with gold, and a white lace head-dress on her golden hair, looking as if prepared to make the best of a bad bargain. Behind her stands a tall figure in green, supposed to be St. Luke. Why St Luke? While, between the high contracting parties, is the open door of an imaginary church: the oddest delineation of a royal wedding to be met with, — more like a dress rehearsal at a small country theatre. It is said this picture was originally one of the Virgin Mary, who was painted out by Henry's order, to make room for himself.

The allegorical picture, lent by the Queen, of "Henry and his Family," is in the style of an old memorial brass; the father in front of a tent, with his sons kneeling behind him with folded hands, the mother and daughters being in a similar attitude opposite, while, overhead in mid-air to the imminent peril of the entire family, St. George on horseback is slaying the Dragon. This picture belongs to the heavy Flemish School, and all the faces are extremely ugly and commonplace.

Before passing to the reign of Henry VIII, we notice the fine intelligent head of the youthful John Colet, the founder of St. Paul's School, of whom when Dean of St. Paul's we have a splendid sketch among the magnificent drawings by Holbien, from Windsor Castle. In this period we may place the half-length, life-size portrait of Margaret Plantagenet, Countess of Salisbury. The refined beauty of face and figure is charming, and though we have not the artist's name we feel sure he lingered lovingly over the canvas, so that under his brush it almost lives, even to the bit of honey-suckle she holds in her hand. This last of the Plantagenets was executed at the age of seventy-seven, with others of her family, save her son Reginald, who had condemned Henry's divorce, etc., had contrived to escape to Rome.

We now come to a perfect galaxy of paintings and drawings, by Hans Holbein, among them being those of himself and his wife, in distemper, on canvas. He has rather a heavy, determined face, dark hair and beard, and vigorous expression. His wife's portrait is very life-like, thin face, hooked nose; she wears a wonderfully painted white net cap, that quite covers the forehead, standing out just enough to show her eyebrows. She is said to have been a shrew, and looks it.

Erasmus introduced this artist to Sir Thomas More, who received him most kindly into his house at Chelsea, where he remained for three years, painting portraits of the chancellor, his family, and friends, after which, in 1534, he became court-painter to Henry VIII.

Beginning with the work executed for his royal patron, we notice a fine cartoon for a large fresco in Whitehall, for which we are indebted to Charles II, who certainly did one wise thing in having a small copy made for Hampton Court, as the original by Holbein was burned thirty years afterwards, in 1698. Henry stands in the foreground in his favorite attitude, arms akimbo, legs apart, wearing the hat and feather we know so well; Henry VII is on a raised step behind, to his left, looking quite refined beside his burly son, who was exceedingly proud of his vast proportions.

All the portraits of King Hal, by this master — some ten or so — are so instinct with life, that we almost feel the man himself stands before us, his gross, selfish face so reflects the passions by which he was governed, while the cruel obstinacy of mouth — seen, by the way somewhat in his sister Mary, Duchess of Suffolk — and the powerful grasp of the hands, plainly tell us how dangerous it was to thwart him, which fact is perhaps a slight excuse for the servility of his courtiers. Here is no flattery surely: the marvel is that any one could be found bold enough to paint a portrait which would almost repel the beholder, did not the consummate skill of the artist force him to linger. There are several portraits of Henry in this room, unnamed, but all have more or less the same expression and grossness, except one by Paris Bordone, in which he looks younger and more agreeable. In all of them the dress is exceedingly rich, embroidered and slashed with gold and jewelled, collar of rubies and pearls, dagger in gold and jewelled sheath, etc., all giving one some idea of the almost barbaric splendor in which he loved to array himself.

The only subject-picture by the great artist, is one of Henry granting the charter to the Barber-Surgeons' Company — the king as stern as if about to pass sentence on the very ordinary looking men, kneeling on each side of him, many of whom seem to expect it. It is thought, however, that Holbein had died of the plague before he could finish this, his largest work.

We must not omit to notice two very large pictures representing Henry's "Embarkation at Dover" and the "Meeting of the Kings at the Field of the Cloth of Gold," by different painters; more interesting as panoramic views of the various processions and pageants, on each shore, than as works of art, which they are not. The first shows us Henry on board the "Great Harry," boats putting out on a stormy sea to it and other large vessels near: the second is evidently produced from sketches, showing various incidents, from the landing in France to the more than brotherly embrace of Francis I and Henry.

And now, *place aux dames*, we come to the portraits of the six wives of Henry, each of whom might truly have said, "Uneasy lies the head that wears a crown." Of those of Katherine of Arragon, the best is one taken in middle life, by Holbein, in which she looks a comely, pleasing and motherly woman, of good presence, but rather *pasée*, so that we are not surprised that her fickle husband got tired of her, with the attractive and lively Anne Boleyn so near. The latter is agreeable and sincere, a good face, but has a weak chin. There are several portraits of this unfortunate lady, but the gem of the collection is a small one, by Holbein, in which she looks young and positively charming. She wears a red and silver jacket bodice, open, with Medici collar, pearl necklace round the "little neck," a white lace head-dress, showing the fair hair, and fastened coquettishly over the left ear by a jewelled tassel. Her older sister Mary had a more refined style of beauty. Jane Seymour's portrait shows delicacy and intelligence, and a certain gravity and sweetness of expression.

As to Anne of Cleves, the wonder is that Henry's courtiers did not know him better than to think so heavy and *triste* a face would please his fancy. His epithet of "Flanders Mare" was a coarse, though not inapt description, and no doubt she was glad to escape by divorce in six months. Unfortunately, Lord Cromwell, who did so much for his master at the Dissolution of the Monasteries and stood exceedingly high in his favor, lost his head for promoting the marriage in spite of Cranmer's appeal for him "who was such a servant as prince never had in this realm," which character is well brought out in Holbein's portrait of this clever man.

We have only a sketch drawing by Holbein of Katherine Howard, in which she is fairly good-looking and ready for a joke — probably she was beheaded before her portrait was painted.

Whether Katherine Parr used her own taste or her husband's, she appears to have worn dresses stiff with embroidery, richly bejewelled, and a large ring on each finger, so that the little hands — she was evidently *petite* — are almost spoiled. Some of her portraits are much faded; still the face shows vivacity and thoughtfulness, which conjoined kept her head on her shoulders. This nation owes more than it imagines to the influence for good which some of these undoubtedly clever women exercised over a man not altogether bad.

Passing to the uncrowned heads in these first Tudor reigns, we begin with the Dukes of Norfolk. The first, Shakespeare's "Jocky of Norfolk," whose portrait is indifferent, was crafty and sensual-looking. He fought in early life for Henry VI in the French wars, and fell at Bosworth Field leading the van for Richard III. For this his son was imprisoned three years by Henry VII, after which the Earldom of Surrey was restored, while for his great victory at Flodden, where he led the English host, he was re-instated in his father's title of Duke of Norfolk. His portrait, fairly painted, arrests attention by the handsome Greek profile, which is set off by the hair dressed, like a barrister's wig, in a single row of close curls. Holbein painted two portraits of the third duke, one of which is inscribed in the quaint spelling of the time.[1] "Thomas, Duke of Norfolk, Marshall and Tresurer off Inglonde the LXVI yere of his age."

The other is exquisitely painted in the minutest detail, and certainly holds first rank as a true work of art. Imprisoned with his son on frivolous charges of aiming at the throne, he only escaped execution by Henry's death, that of his son, the accomplished Earl of Surrey, having taken place nine days before.

In a full-length, life-size painting, by Stretes, this ill-fated knight-errant is depicted as a brave young gallant, wearing brown doublet and trunk hose, white stockings, garter on left knee, and the collar and George on neck: he leans on a broken column, and carries a rich sword and dagger. On each side of him stands a figure bearing an achievement of arms. The name of this Earl is dear to poets, as he wrote the first sonnet and blank verse in English.

Great force of character is shown in Holbein's portrait of the

[1] All printed in Roman capitals.

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Duke of Buckingham; a born ruler, with hands that might have swayed the rod of empire! Of the judicial murder of this popular nobleman, through Wolsey's enmity, Charles V said, "The butcher's dog had killed the finest hart in England." Of three portraits of Cardinal Wolsey, the most striking is by Holbein, representing the great and arrogant ecclesiastic in his scarlet robes and biretta, the picture-frame being surmounted by the red hat and escutcheon. Judging by the face, which is in strong profile, we can understand that, given the immense power this unscrupulous man possessed, Wolsey would be a name of terror to any who opposed him. Very near Wolsey's hangs his contemporary, Warham, Archbishop of Canterbury, said to have been pious and learned, but his superstitious and unfeeling face rather belies his reputation. There was constant discord between him and Wolsey, whom he never flattered. Holbein has not given any softening touches to the bigot's strongly-marked features. The portrait of Fisher, Bishop of Rochester, is that of another plain, selfish-looking church dignitary, by an unnamed artist.

A strong resemblance to Henry Irving is seen in Holbein's portrait of Sir John More, which, judging from the yellowish color of the lights and the brownish tones of the shadows, was painted soon after his arrival in England. Though not so clever as his better-known son, the chancellor, there was a serious dignity in his character portrayed in the artist's truthful manner. Another one, with a peculiar red light on the cheek, shows the feebleness of advancing years in the hands; while amongst the sketch-drawings from Windsor, lent by her majesty, there is a wonderfully careful head of him as a very old, but most loveable man, thoroughly English, the wrinkles most delicately drawn; this was doubtless made for a large picture of him, at the age of seventy-seven, in the scarlet robes of a judge, with Sir Thomas in the purple robes of the Lord Chancellor.

Among the sketches is a fine head of the young John More, reading, and one of Sir Thomas, with calmness, nobility, kindliness and sincerity imprinted in his face. We have thus three generations of Mores, side by side.

The splendid portrait of his kind patron would alone have made the great limner famous, the upright character of this eminent victim of the "Whip with six cords" as the "Six articles" were called, is fully revealed in the great chancellor's serene yet massive face.

The face and figure of Willlam Tyndale looms out dimly from an old canvas, his left hand leans on a Bible, the whole expression is manly and dignified. An inscription tells the place and date of his martyrdom.

The interior of a Gothic church forms the background of the learned Erasmus, who commissioned his friend Holbein to paint it, as well as one of the printer Frobenius, for him. The face of the scholar is very Dutch, rather pleasant but cautious and worldly-wise.

We see in Frobenius the hard working man with plenty of wrinkles, in the ordinary dress of the German middle class: a pleasant change from the long array of lords and ladies in their bejewelled furbelows, which attire we are gravely counselled to study, and we presume imitate, by a lady writer of to-day.

We have almost omitted a masterpiece, the splendidly painted portrait of the first Earl of Southampton, an executor of Henry's will; the soft brown eyes are so fascinating as to make it difficult to examine the rest of the picture, in every point of which is excellence.

Another of Holbein's masterpieces is the exquisite portrait of Christina, Duchess of Milan, who, at seventeen, had been twice widowed. Its simplicity attracts and its grace charms. The great artist rarely had so young a subject for his brush, and, looking at it, one wishes that he had immortalized a few more sweet, girl faces. She looks so natural and withal more modern than many. The slight figure is clad in a black satin gown lined with fur, relieved by narrow white frills; the black hood does not hide but only accentuates the sunny hair; there is a sweet, demure expression in the soft brown eyes, while the color yet remains on lips and cheeks. It was once proposed that Christina should marry Henry VIII, but she declined the honor, saying ironically, that "she had but one head, had she two, one should be at His Majesty's service."

The portrait of Margaret Raper is probably a copy of one by Holbein, kept at Knole; it is very life-like, highly intellectual, but a shade cold. The lace cap she wears is painted with the delicate touch of Meissonier.

The sweet, Puritan face of Lady Anne Heneage will attract many admirers, but the artist is unknown. In the last two portraits we gladly note the absence of the close-fitting head-dress, which so greatly detracted from the beauty of the wearer by entirely hiding her hair, which, however, gradually became a more important feature, fairly flourishing in Elizabeth's reign in enormous wigs.

We close our review of the Early Tudor period, in which Holbein is a bright, particular star, with Janin's anecdote, showing the high esteem in which he was held by Henry VIII. After becoming court-painter, he made a strict rule that, when engaged on a great work, no one but the King was to be admitted to his studio. One day, however, a young nobleman came, and, in spite of the servant's remonstrances, declared "that it was the only time he could spare and that he would go in." Holbein heard the noise and came out, telling his lordship of his inflexible rule but without avail, as he was determined to force an entrance. At last, the painter, beside himself with rage, took him by the waist and threw him downstairs; but, hearing the nobleman's groans and fearing that his high favor with Henry might be useless in so grave an emergency, he hurried by the roof of his house to the palace. Getting an immediate audience, he fell on his knees, asking for mercy. Henry graciously raised him, but looked very grave when he heard that he had laid hands on a peer of the realm. He severely reprimanded the artist, and, pointing to an adjoining room, bade him remain there during the royal pleasure. In a fortnight, the young lord entered the King's presence, supported by servants and presenting a miserable spectacle, being completely wrapped in bandages. "Sire," he exclaimed, "Justice, justice." Henry, to his annoyance, took not the slightest notice of his appearance. "The thing concerns a lord and not a dog, and if Your Majesty refuses me justice, I will obtain it for myself." This was just what Henry wanted. "You forget your bandages, my lord, as well as the respect due to my royal person. I alone have the prerogative of justice. You have quite altered the case, it is no longer a dispute between a painter and a gentleman, but between a gentleman and a sovereign. It behoves you to cry for mercy rather than demand justice. As for Holbein he is one of the most precious jewels in my crown, and your duty is rather to preserve him for me than quarrel with him. Should I lose him, it would be long ere he could be replaced. Of any seven peasants I could make seven lords, but from among seven lords such as you, I could find no painter such as he. You will, of course, do as you please, but I advise you to take warning and remember that whoever insults Holbein insults me. Adieu. Holbein! return in peace to your studio. You are under the mantle of the King!"

Of Henry's son and heir, of whom he was very proud, there are several portraits, from the chubby child, just able to stand, on through boyhood and youth, when we see a strong resemblance to his mother, Jane Seymour. He has a lovable face, both clever and manly, though delicate. The large picture of Edward presenting the Charter of Bridewell to the Lord Mayor and Aldermen of London depicts the young sovereign, in his robes, seated with great dignity on the throne, surrounded by officers of state, who look thorough time-servers. Strete painted this and a finer one commemorating the endowment of Christ's Hospital — the "Blue Coat School" — but the Governors have not lent it to this exhibition. Both are in Holbein's manner.

A personage of far greater importance than the boy-king was his uncle, the "Protector" Somerset, on the well-defined features of whose face "cautious diplomatist" is plainly written; while the dark eyes, never withdrawing their penetrating gaze, seem to say: "Can I trust you?" He wears a small black cap and doublet, with white ruffs on neck and wrists. The portrait of his shifty elder brother, Lord Seymour, of Sudely, hangs near. He wears a crimson and gold doublet, black surcoat and cap with red feather, and is rather handsome. But he was a mean man; he flirted with Princess Elizabeth before and after he married his old love, Queen Katharine Parr. But at last, for conspiring against the Protector, he was sentenced without trial by the Council and beheaded.

The portraits of Lady Jane Grey show us the unassuming and pleasant face of this intelligent and luckless victim of her parents' ambition. She wears the small jewelled cap then coming into vogue, but otherwise the dress is unbecoming.

The greatest admirers of Queen Mary's policy — if such there be — must allow that she wears a very gloomy and forbidding expression; though slightly resembling her mother, she misses her kindly countenance. In only one of several portraits, by Sir Antonio More and others, is she seen to relax into a smile. In all others she looks sour and discontented, while her dress is either black or brown.

We need waste no words on the portraits of Philip II, even though one is by Titian, since far more agreeable than the faces of these two persecutors is that of Cardinal Pole. This handsome English gentleman resembles his mother, Margaret, Countess of Salisbury, in delicate refinement of form and feature: his long, fair beard looks quite modern, as until the closing years of Henry VIII all faces were closely shaven. He wears the robes and biretta of a cardinal. The portrait here described was painted when he was in Rome, aged thirty-five, by Del Vaga. A second one, by Caracci, is dated 1555, in which year he returned to England as a Papal legate on Mary's accession. In it and another, the artist of which is unnamed, he looks much older and more of a churchman. He was, however, too tolerant and mild to please the authorities in Rome, and would have been recalled but for Mary's great regard for him. It was strange that both should die on the same day.

In the Elizabethan room, Elizabeth herself claims the first notice. There are no less than twenty-six portraits of her as Queen, at different ages, and some half-dozen as Princess. The earliest one, which she sent to Edward VI, represents her as a girl twelve years of age, very plain, but with well-marked features. The majority of her portraits show scarcely any eyelashes and very thin eyebrows, which cannot but strike one in going round the room. That she was exceedingly particular as to her portraits is notified by the fact that, in 1563, she issued a proclamation to the effect that none but a "*special connyge paynter*" was permitted to draw her likeness, and ordering all by unskilful artists to be burned. It was probably at this time that Zucchero was appointed court-painter, and there is a marvellous delicacy of texture in all his work. The ruff, which was then worn, lent itself to his exquisite brush, for in some paintings the lace looks like a spider's web, so delicate and perfect is it. An early portrait of Elizabeth, taken, evidently, shortly after her accession to the throne, represents her seated, full face, in royal robes, gilt-edged

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ruff, jewel crown, her hair hanging loosely over her shoulders, giving a girlish appearance.

Among Zucchero's wonderful portraits of the Queen, one, inscribed "Aged 42," is a perfect gem: a half-length, in gauze dress elaborately jewelled, open-lace ruff, with gauze wings. The face has a fine expression, and the whole conception and work is most delicate and beautiful. It is, indeed, *the picture* of the room. It is lent by Jesus College, Oxford.

A very remarkable painting sent from Hatfield House by Lord Salisbury, represents Elizabeth in a robe scattered over with eyes and ears — typical, one may suppose, of her omniscience — the right hand grasping a rainbow, while on the left sleeve is embroidered a serpent, she has a splendid aigrette in her hair. Another dated 1574, is totally different in expression and almost in feature: the face is pale and very calm and thoughtful, with an entire absence of the conceit so marked in most of her portraits.

The last portrait we can notice of the "Virgin Queen" is contained in a cabinet 37 x 27½ inches, on the two doors of which — standing open — are portraits of her four courtiers, Raleigh, Lord Burleigh, Essex and Leicester. In this, which is by Zucchero, her expression is soft and lovely, the eyes more drooping than in any other portrait where she is "every inch a queen" — in the cabinet she is a woman — the date is 1567. The story goes that when Elizabeth was staying at Kenilworth, Leicester asked if she approved of everything, and she answered that the garden was not in sight of the house — upon which he had one made during the night under her windows, which so pleased her that this picture was painted and given to him.

One cannot help being amused, when looking at all the Queen's portraits, at the changes that are rung on her hair, which is sometimes flaxen, then rich red, again a dark brown; but, to a lady who died possessed of two thousand wigs, this was an easy matter — it is the same with her eyes, sometimes brown, sometimes blue. All the ladies of the period are painted with the same long-pointed stomacher which makes one wonder whether they ever sat down.

Among the portraits of the statesmen of the time, the earliest is that of the Marquis of Winchester, the self-named "willow"; he has small eyes with a subdued twinkle and very florid complexion: there is no artist's name. Only one portrait out of seven of Cecil, Lord Burleigh, is named, it is by Marc Gheeraedts. All of them plainly show the cautious eye and firm mouth which made him the backbone of Elizabeth's reign: in one portrait the face is more genial than in most, while the hands are well painted, the glove being held with a firm grasp. Robert Cecil, first Lord Salisbury, youngest son of Lord Burleigh, appears to have inherited a full share of his father's genius for diplomacy, the face is delicate, the veins on his temples being clearly traced, chin very pointed, full grey eyes; he holds the privy purse as Lord High Treasurer. Sir Nicholas Bacon, aged fifty-five, a dark, mellowed painting of a man we know best as the father of his son, though he was one of the prominent statesmen of Elizabeth's reign. The picture hung next to this is a fine study in black-and white, the face and beard finely executed, of Lord Arundel, of Wardour, called "The Valiant."

Among seven portraits of Elizabeth's favorite, the Earl of Leicester whom she called her "Sweet Robin," is one without the artist's name, with small white ruff and dark green doublet. The head is well shaped, eyes watchful and wary; face, on the whole, not pleasing, the dress in all is strikingly handsome. There is also a fine marble bust of Leicester in the entrance to the Elizabethan room, together with one of the Queen, in which he wears a cap and feathers, and is not unlike our own Prince of Wales. Robert Devereux, second Earl of Essex, who was introduced to Court by his guardian, Lord Burleigh, soon became a favorite owing to his "goodly person" and "innate courtesy," though in his first portrait he has all the appearance of a petted, sulky boy; the details in this painting are very fine, especially the exquisite design on the belt; he wears black embroidered doublet and trunks. The only named portrait of Essex is by Van Somer, very finely executed; the effect of black hair and auburn beard, which occurs in all his later portraits is peculiar, the face and expression are most pleasing; he is also one of the four courtiers on the cabinet painted by Zucchero. Through all vicissitudes he retained the Queen's affection, though on one occasion she boxed his ears for rudely turning his back on her, telling him to "go and be hanged"; her grief at his death is well-known.

There is a magnificent picture of Sir Walter Raleigh and his young son — born in the Tower — dated 1602. He is a noble-looking man, tall, well shaped, with dark hair: there are six portraits, in all of which the strong reliable face is well depicted.

After Raleigh, one naturally turns to the portraits of the celebrated navigators, who did so much to spread the fame of England by their deeds of daring. One of Frobisher, at the age of thirty-nine, by Cornelius Ketel, is a fine specimen of the buccaneer of the day, with florid face, buff-leather jerkin and hose, holding a wheel-lock pistol in his right hand. The picture is much cracked. Another of him, artist unnamed, is of quite a different type, perhaps of later date, but both are vigorous in treatment and style. As an inscription on the back tells us, Frans Pourbus, by command of the Queen, painted a portrait of Drake. The face is much scarred, the eye clear and resolute, with a very engaging countenance. He wears the tall hat of the time decorated with a gold trident.

It would be impossible to consider in detail all the portraits in this room which so fascinate one, either by their beauty of execution or by some special charm of feature; but we must not fail to remark six portraits of Shakespeare, all bearing a certain likeness, and yet so different to our conception of the man. One wearing a square collar, with ear-rings, black hair and florid complexion, with not a trace of poetic genius in his appearance, is said to be by a Spanish artist, but unnamed. The "Fenton Portrait" is more extraordinary still, the head sloping backward and the expression dull and flaccid. Zucchero gives us one of his charming pictures, representing Shakespeare in a black dress with white lace ruff, a peculiarity of this portrait being the fair hair and beard, instead of black, as in the others. This is inscribed "W. Shakespeare"; and yet another picture has on the background his coat-of-arms, thus disposing of the assertion, recently made, that he was base-born.

A thorough Englishman is Sir Richard Wingfield, by Jansen; his bluff, weather-beaten face beaming with good-nature. The chief charm of this vigorous picture is the gold-embroidered scarf crossed over the breast and tied under the left arm. When Elizabeth asked him "what reward he was to have for his faithful services," the old courtier replied: "The scarf your majesty wears is sufficient reward for me." The Queen at once took off her scarf, tying it round her gallant old general. Another of the same type is Sir Ambrose Cave, who is represented wearing the Queen's garter of yellow silk, which she had dropped while dancing. A bright expression is on his face, which is withal daring, as might be supposed from the story.

William Drummond, of Hawthornden, the Scotch poet, is exquisitely painted: the curling brown hair, clear eyes and open expression are full of charm.

John Fletcher and Ben Jonson are fine specimens of poets — no long curling hair and falling collar, but open, fresh, bright-looking men. With neither is the artist's name given. Fletcher holds a cartel in his right hand, with the following quaint lines inscribed:

> "The pencil and the pen have studied together,
> To show thy face and witt (Flecher) and whether
> Have done their best, I know not, but confess
> None but thy own pen could thy witt express."

There is a very fine full-length portrait of Jane Dormer, Duchess of Feria, a companion of Queen Mary, and later a close friend of Mary, Queen of Scots. She is splendidly dressed, and regal in her style, so marvellously like Her Royal Highness, the Duchess of Fife, that she might have been the original of the portrait.

Four beautifully-executed pictures of Anne Clifford, Countess of Dorset and Pembroke, call for special mention, representing her in childhood, youth, middle-life and widowhood. The eyes are so lustrous and speaking, with a wonderful pathos and trouble in those of middle-life.

We reserve the armor, relics, books, MSS., etc., for a second notice.

INDUSTRIAL SCHOOLS. — THE ONE AT MUNICH AND ITS CURRICULUM. — GERMAN SPRÜCHE FOR FIREPLACE MOTTOES.

IT may be well to consider another class of institutions, namely, the Industrial Schools, the success of which must be of vital interest to the architectural profession and the public at large.

For, that the belief that the architectural progress of a country is due entirely to the architectural profession is a fallacy is quite evident. And that encouraging the proper training of the architect by publishing schools is but a step towards, and can but smooth the way towards high achievement in architecture, and that it is but a link in the chain of circumstances necessary to excellence in that art is quite as evident. Alone the architect can do but little and it is only with an army of trained and artistically cultivated hands in the kindred arts that he can hope to reach the high level of art characteristic of several eras.

Neither can money alone create an art, it can and then only under the most favorable circumstances but foster it. All the wealth of Athens could not have created a Parthenon, had not at that time a Phidias lived. Nor could all the gold and tributes of the Roman Emperor have created a Santa Sophia had not Asia Minor given to the world two of its greatest architects. But how impotent they would have been without the assistance of the large body of sculptors, painters, mosaic-workers, gold and silver smiths, etc., at their disposal, who vied with one another; each individual desirous of making his little mite add to the splendor of the most magnificent interior ever produced.

It is needless now to say that the industrial arts during our century have not flourished as they did during the previous centuries. When this became evident and when able minds took

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hold of the matter of raising the arts above their normal level and realized that there must be a somebody between a mere mechanic and a professional man, it was then that the Industrial Schools were established — which, even yet, are but experiments and perhaps only the prototypes of the perfectly developed schools soon to come.

How the problem was solved in Germany may be ascertained by examining the art-work of to-day and that of twenty years ago.

The school at Munich, probably — if the number of medals received at various exhibitions is a criterion, holds a high place among like institutions. Its object, as set forth in the catalogue, is to properly train and give instruction to those desiring to engage in the pursuits of architectural draughtsmen,[1] mosaic-workers, decorators, carvers, modellers, stucco and metal workers, stained-glass painters, also xylographers, lithographers, designers of wall-paper, carpets, etc. The school also offers preparatory courses to those intending to enter the Academy and the Polytechnique in the architectural course. Before entering any one of the departments, the students must have completed a general course (the time of completion depending upon the expertness of the individual).

This course is as follows:

Linear drawing, projections and elements of descriptive geometry.
Perspective: shades and shadows.
Architectural-draughting.
Ornament — copying from plates and drawing from the round.
Surface-decoration — *sgraffito, intarsia*, mosaic, etc.
Flower-painting, and drawing the various forms used in decoration.
Modelling and carving.
Lectures on the styles, and also practice-work.
History of art.
Lectures on Anatomy.

Now follows the department instruction. I shall only consider the course intended to fit the student for a career as architectural draughtsman. In this course as well as in all the others the absence of all theatrical work is very noticeable. The entire day is devoted to draughting and designing. The student at first copies, enlarges and then slightly modifies plates which are given him, and at last designs. In this course special attention is paid to the designing of furniture, iron work, exterior decorations, and the various ornamental parts of a building. Upon leaving the school the pupil is supposed to be proficient in all these branches, but yet knows nothing whatever of the general construction of a building. Unversed in the mysteries of I-beam and truss, with a mind unembittered by contact with the oblique-arch, he is yet a valuable assistant to the architect who employs him.

The entrance requirements are as follows: The student must be fifteen years of age, and must have a diploma from a school, an equivalent of which I should say would be rather higher than one from our grammar or intermediate schools. He must also have a knowledge of freehand drawing and be able to make a clay model from a drawing which is given him. Any one of the courses can be completed in three years, but often four and even five years are taken. During the winter term — the school-year is divided into two terms — six hours daily are spent at the School; there are also night classes, the attendance at which is optional, but only members of the School may attend. Seven hours' work per day is required during the summer term. Something quite unusual is the department for girls and young women. Here instruction is given in needle-work, drawing, painting on porcelain, faience, etc.

A few statistics may be of interest. The School was founded in 1868. During the last year there were 329 people in attendance, 250 men and 79 women. Among the men were 21 foreigners.

A walk through the School shows some excellent work, especially in wood-carving and metal-work, also in draughting — brush-work in particular. Almost all the work is in the Renaissance style, the influence of the Dürer and Holbein period predominating.

In the department of interior-decoration the colors used are almost entirely Roman: no originality whatever is shown in their choice; the forms, however, are sometimes quite novel. One notices upon entering the freehand draughting-room the absence of the casts of Venus, Homer, Mercury and all the others one has learned to associate with a drawing-school. It appears that only parts of the body are drawn from plaster-casts, and when the pupil has gained enough proficiency to draw the whole human figure, he draws directly from life.

Considerable attention is now paid to the Rococo — "the utter ruin of art" — in the student's work, often verging into the periwig or pig-tail style. No attention was given to this style, which marks the degeneration of pure Renaissance, until within the last few years, then it became necessary, because of the demand for Rococo designers, for it seems that the public is again captivated by the dazzle and false splendor of a Rococo interior. In hotel and café architecture, as may be imagined, this style is particularly popular, for cafés in Munich are always made very attractive. And, indeed, one can get a fair knowledge of the styles by scanning the advertisements in the newspapers. You will meet with some such as these: "Dinner in the Rococo rooms at twelve," "Best wine at the Gothic cellar," "The Turkish coffee-house," "The Arabian café," "Old German-Renaissance wine-house," etc. Even in cigar-stores one notices the pervading desire to decorate everything. A tobacco-shop is poor, indeed, that has not an Oriental air about it, at least so much of one as can be produced by a few Turkish rugs, a divan and the usual inlaid table with a hookah on it. The beauty and value of all these restaurants, and so on, lies in the fact that everything is in good style and perfect keeping; thus if you enter an old German-Renaissance establishment, you must expect to sit on an antique wooden chair with its spreading legs; at a Turkish café you can recline on the softest of divans, or, elsewhere, on the twisted chair of the Rococo period, or perhaps in the sombre Gothic hall you can, resting around the huge oven of painted tile, dream of chivalrous knights and lovely ladies.

In a recent article in one of the German art-journals, the methods of these schools were quite severely criticized for the lack of originality shown in the student's work. That originality is not much encouraged is evident to any one who visits the school, but whether this is a fault, is an open question.

Now that I have touched the subject of interiors, it may not be amiss to treat briefly of a matter which, although it may be found of use, will not, perhaps, furnish a very readable page. It has, I think, of late become the fashion to bring the literature of the old Germans in close connection, as it were, with our hearths. Not only do we frequently see their proverbs, or, more correctly, sayings (*Sprüche*) over or on our fireplaces, but also ingeniously worked into a frieze around a room — a good idea and an agreeable change from the everlasting garlands and the running acanthus ornament. If I may be so bold as to say it, not a few times has an architect or draughtsman, after having wearied his eyes by vainly attempting to decipher some saying on a photograph of some old interior, given it up in despair, and resorted to his own poetic effusions or to "Salve." This latter word, although it undoubtedly strikes sympathetically on the ears of the initiated, must carry with it to the ears of the less instructed recollections of an apothecary-shop, minus the soda-water fountain and the permeating "Jockey-club" perfume, and thoughts which are better distant from the hearth than present to mar its cheering influence. And in these days it is the unsophisticated mind who resort to the fireplace as a fireplace, and not solely as a shelf for exhibiting the results of a few days of shopping in the stores of Paris or New York, or perchance a Japanese bazaar, together with the latest bits of art from the hands of "our daughter," in the shape of a few brass plaques or a wooden spoon tastefully and artistically decorated with gold paint and a blue ribbon, while the modern man has his gilded and perfected hot-water radiator.

There are, of course, a large number of very apt and beautiful English quotations, but they are not what is wanted, probably for the same reason that New York caterers sell a "Boston oyster-fry," while in that city itself only "New York frys" are in demand. At the present time, I think I am right in believing the old German "*Sprüche*," very numerous indeed, have to a certain extent replaced Latin quotations. It is, therefore, and in view of the fact that a suitable collection has never been made, that the few which shall presently follow are now presented. Most of the "*Sprüche*" one meets with are suitable only for club-rooms, public dining-rooms, etc., because it must be remembered that applying them to such objects as we do now is a modern innovation. They were originally seen only on drinking-glasses, bowls and mugs, or perchance were the words on the weather-beaten sign-boards which betokened the existence of the "Blue Boar" or the "Golden Stag," and their respective jolly, red-faced keepers.

The mottoes which follow (*a*) have been taken from modern tile-stoves made after old patterns, and are very well-suited for fireplace decoration. The group *b* can be applied anywhere. They do not speak directly of the good cheer of hearth and home, but sometimes express good and beautiful sentiments, and always open a world of thought.

(*a*) EIN EIGENER HERD, IST GOLDES WERTH,
IST ER SCHON ARM, SO IST ER DOCH WARM.

(*a*) [*One's fire-side is as good as gold,*
Though humble it is never cold.]

WO BLEIBT HARM,
WENN HERZ UND STUBE WARM.

[*No harm befalls*
Within warm walls.]

AM FEURIGEN OFEN, AM FEURIGEN WEIN,
DA MAG WINTER, WINTER SEIN.

[*Who cares for winter and his snows,*
While the fire leaps and the good wine flows.]

(*b*) EIN LEERES HIRN, EIN HOHLER SINN,
GLEICH LIEST DER TEUFEL MESSE DRINN.

(*b*) [*The devil can no lodging find*
Where one has healthy brain and mind.]

EDEL MACHT DAS GEMUETH,
NICHT DAS GEBLUET.

[*In lofty mind and sterling worth*
Is nobleness — and not in birth.]

WER REDET, WAS IHN GELUESTET,
MUSS HOEREN, WAS IHN ENTRUESTET.

[*Have a watch on your tongue lest perchance you may hear*
Unpleasing retorts from those who are near.]

[1] Note that in Germany a distinction is made between the man who employs in architectural draughtsmanship as a life-pursuit and the scientific school-graduate who adopts it simply as a stepping-stone to future practice as an architect.

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WER ENTBEHRT DIE EHRE,
DEM FEHLT DIE BESTE WEHRE.

[*With honor, hence*
Flies best defence.]

WIE SICH DER MANN WEHRT, SO WIRD ER GEEHRT.

[*In the world's sight*
As we fight
So will we
Honored be.]

DIE WAHRHEIT IST EIN SELTEN KRAUT,
NOCH SELT'NER WER ES GUT VERDAUT.

[*Truth is an uncommon vegetable*
And still more rarely palatable.]

DER ALTEN RATH,
DER JUNGEN THAT,
DER MAENNER HUTH
WAR ALLZEIT GUT.

[*The word of the sage, youth's fiery mood,*
Man's watch and ward, were ever good.]

EHR, LEHR, UND WEHR,
KEIN MANN BRAUCHT MEHR.

[*Honor, learning, defensive power—*
What in life can man ask more?]

FREUND SIE AUF DICH
UND NICHT AUF MICH,
UND FEHLE ICH
SO BESS'RE DICH.

[*Rely on yourself and not on me,*
Then if I fail unharmed you'll be.]

FRISCH DARAN SCHLAEGT HALB DEN MANN.

[*To strike at first with might and main*
Is half the victory to gain.]

TRINK UND ISS,
GOTTES UND DER ARMEN NICHT VERGISS.

[*Eating and drinking, be ever thinking*
Of God and the poor outside your door.]

MAASS IM TRINKEN UND ESSEN
SOLLST DU NIE VERGESSEN.

[*Meat and drink do not abuse,*
All due moderation use.]

WER TRINKT OHNE DURST UND ISST OHNE HUNGER,
STIRBT DESTO JUNGER. (Luther)

[*Who eats when not hungry and drinks when not dry*
From foolish indulgence the sooner will die.]

ISS DEIN BROD MIT FREUDEN, TRINKE DEINEN
WEIN MIT GUTEM MUTHE. (Bible)

[*Eat with hilarity*
Drink with charity.]

VIEL ZEHREN UND GASTEN
LEERT KELLER UND KASTEN.

[*He who ever drinks and eats*
All too soon his purse depletes.]

TRUNKNER MUND
ZEIGT HERZENSGRUND.

[*Who drinks too much must have a care*
Lest his secrets be laid bare.]

ZU WENIG ODER ZU VIEL
IST ALLER THORHEIT ZIEL.

[*Who eats and who drinks just the proper amount*
That man as a sage among men you may count.]

UEBERMASS, SPRENGT DAS FASS.

[*When the cask is running o'er*
Do not try to put in more.]

SEI NUECHTERN UND KALT
WILLST WERDEN ALT.

[*The sober and the self-restrained*
A pledge for green old age have gained.]

TRINK UND ISS,
GOTT NICHT VERGISS!
STERBEN IST GEWISS.

[*Eat and drink, of God ever think,*
The time draws nigh for us to die.]

TRINK UND ISS,
DEIN LEID VERGISS.

[*Drink and eat*
And sorrow forget.]

TRINKT UND ESST GOTTES NICHT VERGESST,
GOTT, THU DICH ERBARMEN UEBER MICH ARMEN.

[*Eating and drinking of God be thinking*
May He forgive and help us live.]

The last twelve quotations would be suitable for a dining-room; they were perhaps originally on cups and goblets, but are such as would meet the approbation of the most confirmed teetotaller.

THEO. F. LAIST.

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

A PORTION OF OSBORN HALL, NEW HAVEN, CONN. MR. BRUCE PRICE, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print issued only with the International and Imperial Editions.]

GRACE METHODIST EPISCOPAL CHURCH, NEW YORK, N. Y. MESSRS. J. C. CADY & CO., ARCHITECTS, NEW YORK, N. Y.

THIS church is placed on the north side of West 104th Street, near 9th Avenue. The building has a frontage of 82′ on the street, and a depth to the rear of chapel of 156′, the chapel portion being two stories in height. An old lane now unused on one side and the westerly line of the old Croton Aqueduct cause the irregularity in the rear portion of the lot. A rather simple treatment has been adhered to in the construction of this building, and good workmanship and material sought for in preference to any elaboration of detail. It is designed, however, to panel the front main vestibule in oak, and provide a floor in it of marble mosaic, giving an air of elegance and dignity to this part of the building. The materials for front are Philadelphia brick, with a dark brown sandstone for trimmings, the mullions of the large front window being in stone. The total seating-capacity of the church is 879. The total cost is $55,800.

THE CATHEDRAL, PRATO, ITALY.

IN the International Edition this Print appears as a Granochrome.

THE PLANS OF NETLEY CORNERS, MINNEAPOLIS, MINN. MR. J. C. PLANT, ARCHITECT, MINNEAPOLIS, MINN.

THROUGH an oversight on our part, these plans were not published in the issue for last Saturday.

STORAGE AND WAREHOUSE DEPOSIT COMPANY'S BUILDING, MINNEAPOLIS, MINN. MR. L. S. BUFFINGTON, ARCHITECT, MINNEAPOLIS, MINN.

COXTON TOWER, ELGIN, SCOTLAND.[1]

"NOT one fragment of history has been preserved relating to the small but picturesque tower delineated in the accompanying illustration; and so little attention does it seem to have excited, that it is not even mentioned in any of the numerous descriptions of Scotland, although it stands out a conspicuous object in the landscape near the great north road from Aberdeen to Inverness, and is little more than two miles distant from the town of Elgin. There is, however, little reason to be surprised in this instance; for the rugged buildings of the north of Britain, instead of having been watched over or preserved, were, until recently, too frequently only so many stone quarries and stores of ready prepared timber to their proprietors, and even to strangers. But notwithstanding the neglect of history and the want of the 'long pedigree,' we do not fear any lack of interest for our few remarks on Coxton.

"For our own part we are not sorry that this building has hitherto escaped notice; had it been otherwise, we might not, perhaps, have been the first to draw attention to the existence of one entire baronial remain in Scotland, or enjoyed the pleasure of delineating one building of a most interesting class, which the hand of man has not robbed of anything belonging to the original design. The ancient fortified house we are considering wants, certainly, the walled court-yard which formerly enclosed the two of its sides upon which small and heavily-barred windows appear; but it is otherwise perfect and possesses peculiarities entirely its own.

"In general effect, Coxton resembles many Border towers, having the lower room or vault for sheltering, or rather securing, the owner's cattle against marauders, and above this the dwelling-house of the laird, comprising the scanty accommodation of three rooms and several small closets, the latter being within the substance of the walls.

"To the lower dwelling-room there was[2] no access from without, save by means of a ladder; and what is more singular, there is no

[1] It should always be kept in mind that these illustrations from the "*Baronial and Ecclesiastical Antiquities of Scotland*," [1845] by R. W. Billings, are republished very largely for the sake of giving instruction in one manner of the rendering of architectural drawings.

[2] An external stone stair has recently been erected.

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appearance on the exterior of any means of access to the upper rooms, although there is a circular newelled stair within the substance of the wall. The sides represented in our larger plate, which were formerly protected by the walled court, have rather a cheerful expression: and the pretty hollow corbelled and cabled open turret, from whence a parley might be held, has a character perfectly unique. But the opposite angles are sufficiently dismal, and were rather to be avoided by the stranger in former times, for not a window or opening appears in the walls, excepting so many port-holes for arrows or musketry.

"In many of the old Border towers and larger castles we have vaulted rooms; and indeed, in general, all the apartments on the ground-floors of this class of buildings are vaulted. Sometimes the upper room is also arched, and there is one instance (at Burgie) where the two upper stories are by this means protected from combustion. But Coxton is entirely fireproof; and excepting its two external doors, which are backed by massive gates of cross-barred iron, no wood whatever is used in the whole building. Neither is there a slate, for the whole roof is stone, forming on the exterior a sloping line and internally a high-pitched pointed arch. The same fireproof construction is applied even to the covered turrets at the angles.

"When we consider that every floor is a heavy semicircular stone vault, the absence of external buttresses naturally forces itself upon our observation. No defect, however, has resulted from this, for by an admirable contrivance they are rendered unnecessary — the floors are vaulted at opposite angles. Thus, if the sides of the lower-room arch stand east and west, those of the arch immediately above are north and south, and so they keep alternating. By this simple arrangement, the weight of one floor or vault acts as a counterpoise to the arch beneath; and the efficiency of this construction is evinced by the state of the building. Not a crack is visible; and we predict that, until the stone disintegrates, the castle will stand.

"Within the rooms is a singular provision for communication, perfectly independent of the staircase. In the centre of each floor is a square stone, fitted into a groove. These stones, when lifted up, show an opening from the summit to the base of the tower, and by the aid of a rope and pulley the requirements of its inmates might be attended to, and all the inconveniences of carriage up the narrow staircase avoided.

"Our notice of Coxton commenced by stating that it has no historical record. There is, however, over its principal doorway, a large carved stone containing some time-worn initials and armorial bearings, and the date 1644. This has been inserted in the building at a period considerably later than that of its construction; and, judging from parallel examples of style, we should be inclined to fix the foundation of the tower fully a century earlier than this date."

✓ CRAIGSTON CASTLE, ABERDEEN, SCOTLAND.[1]

"THIS broad, square mass of building has some features in common with Fyvie, from which it is but a few miles distant. The high, deep arch joining the two towers, or wings, is one of these points of resemblance; but, in the general outline, Craigston wants the multitudinously spiral summit which gives so light and rich a character to its neighbor, and is conspicuous for a massive plainness of outline, which appears to have been a prevailing aim with the architect, as he had laid in the corbels of square turrets at the corners, but appears to have changed his mind, abstaining from conferring on the building the light, aërial effect of these terminations. Though thus severe in its outline, however, the edifice is not unadorned. Over the top of the arch, and from the one tower to the other, stretches a border of grotesque statuary. The inside of the castle is remarkable for a spacious hall, now converted into a handsome drawing-room, containing numerous specimens of curiously carved oak panelling, of the same age as the building, and the remains of its original decoration. These present the effigies of a very miscellaneous assemblage of heroes, kings, cardinal virtues and evangelists. Among others, one room contains the sovereigns of the Stuart family down to James VI; and another, the carved likeness of Prince Henry, the heir to the crown when the castle was erected; also of his brother, Prince Charles, both being represented as children. . . . Among the pictures in the castle are three by Jamieson; of these, one is a portrait of General David Leslie; another, that of William Forbes, Bishop of Edinburgh; and the third, that of Sir Alexander Fraser, of Philorth. There are also portraits of the last four members of the family of Stuart; namely, James, Prince of Wales, and his princess, Clementina Sobieski, with their sons, the Prince Charles Edward, and Henry, Cardinal of York. These, with full-length pictures of the last Earl Marischal, and of Captain John Urquhart, of Cromarty and Craigston, are originals, and painted about the year 1735 by Francesco Trevisani, an eminent portrait-painter of Rome.'[2]

"The domain of Craigston appears to have belonged of old to the family of Craig, from which Sir Thomas Craig, the celebrated feudal lawyer, was descended.[3] Of the building of the castle there is a very distinct account cut in a stone in front, in the following terms: 'This vark fovndit ye fourtene of March, ane thousand sex hounder four zeiris, and ended ye 8 of Decembr 1607.' Before this event, the estate appears to have passed from the family of Craig to a cadet of that of Urquhart of Cromarty. It appears to have been erected by the same John Urquhart, to whom Arthur Johnstone dedicated the following epitaph:

> "'Occidit Urchardus, quo nemo beatior, ævi
> Jam fatur, et famulas quas sibi fecit, opum.
> Posteritas, cui liquit agros et prædia, disce
> Illius exemplo vivere, disce mori.'[4]

"The proprietor of Craigston, at the time when the castle was built, is frequently mentioned in local history as 'The Tutor of Cromarty.' So complete a supremacy attached to the head, genealogically speaking, of a family at that period, that the most honorable title by which an uncle belonging to a junior branch could be named was by his office of tutor to the young heir, incident to his relationship. The individual to whom the Laird of Craigston thus acted as tutor was no ordinary man — Sir Thomas Urquhart, the author of several strange works with long Greek names, the translator of Rabelais, and the narrator, if not the inventor, of the incidents which form the biography of the wonderful Admirable Crichton.

"The connection of its inmates with this erratic genius is, perhaps, the most remarkable instance that has to be recorded about this unobtrusive mansion. If we may believe his own statement, his early progress did much credit to his uncle's guardianship; for, when describing his companions as absorbed in the field-sports of the age, he says: 'I was employed in a diversion of another nature, such as optical secrets, mysteries of natural philosophie, reasons for the variety of colours, the finding out of the longitude, the squaring of a circle, and wayes to accomplish all trigonometrical operations by sines without tangents, with the same compendiousness of computation, which, in the estimation of learned men, would be accounted worth six hundred thousand partridges, and as many moorfouls.'[5]

"The work by which Sir Thomas Urquhart is best known to the world is his '*Jewel*,' in which he arranges the chronology of the history of the world by 'deducing the true pedigree and literal descent of the most ancient and honorable name of the Urquharts in the house of Cromarty since the creation of the world until the present year of God 1652.' It has often been supposed that, being written by the translator of Rabelais, the '*Jewel*' is a satire on the flagrant genealogies of the seventeenth century; but there is far better reason for believing that it has been dictated by inordinate and almost insane self-conceit. The first thirty-nine names in the genealogy are founded on that scriptural pedigree, the greater part of which contains the common ancestors of all the world, and it is in the year 1810 of the world's age, and 2139 before the Christian era, that the house of Urquhart branches forth in the person of 'Escrinon,' married to 'Narfesia.' 'He was sovereign prince of Achaia. For his fortune in the wars, and affability in conversation, his subjects and familiars surnamed him εὐτυχῆτον,[6] that is to say, fortunate and well-beloved. After which his posterity ever since hath acknowledged him the father of all that carry the name of Urquhart. He had for his arms, three banners, three ships and three ladies in a field *or*, with a picture of a young lady above the waste, holding in her right hand a brandished sword, and a branch of myrtle in the left, for crest; and, for supporters, two Javanites, after the soldier habit of Achaia, etc. Upon his wife Narfesia, who was sovereign of the Amazons, he begot Cratynter.'[7]

"Such, if we credit the head of the house, was the origin of the family, a descendant of which still inhabits this mansion."

[Additional Illustrations in the International Edition.]

FOUNTAIN IN THE GARDEN OF THE GRAND TRIANON, VERSAILLES, FRANCE.

[Etching.]

TOMB OF THE MOLPURGO FAMILY, TRIESTE, AUSTRIA. HERR RENDIC, SCULPTOR.

[Gelatine Print.]

CITY-HALL, TRIESTE, AUSTRIA. HERR BRUNI, ARCHITECT.

[Gelatine Print.]

BEATEN BRASS DOOR: HOUSE FOR MR. E. LONG, R. A., HAMPSTEAD, LONDON, ENG. MR. R. NORMAN SHAW, ARCHITECT.

ENTRANCE: HOUSE FOR MR. E. LONG, R. A., HAMPSTEAD, LONDON, ENG. MR. R. NORMAN SHAW, ARCHITECT.

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[1] It should always be kept in mind that these illustrations from the "*Baronial and Ecclesiastical Antiquities of Scotland*," [1845] by R. W. Billings, are republished very largely for the sake of giving instruction in one manner of the rendering of architectural drawings.

[2] Hay's "*Castellated Architecture of Aberdeenshire*," 100, 102.

[3] Tytler's "*Life of Craig*," p. 2. *Collections on the Shires of Aberdeen and Banff*," p. 481.

[4] *Delitiæ Poet. Scot.*" 1, 618.

[5] "*Introduction to Works*," p. 7.

[6] So printed in the collected edition.

[7] "*Works*," p. 156.

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ST. ANDREW'S CHURCH, BRECHIN, SCOTLAND. MESSRS. ROSS & MACBETH, ARCHITECTS, INVERNESS, SCOTLAND.

The outlay on the building, so far as executed, is about 6,000*l.*, but 1,000*l.* is still required to finish the tower and spire, etc. The building is executed of a warm gray freestone. The columns of nave are of red granite, and the inside walls faced with a warm red stone. The aisles are only four feet wide, and serve as passages, an arrangement which is found both convenient and effective, as giving the greatest nave space and view of the altar.

ROUEN, FROM MOUNT ST. CATHERINE, AFTER A DRAWING BY JOHN SELL COTMAN.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A DIPLOMA AND A LICENSE FOR PRACTISING ARCHITECTURE.

To the Editors of the American Architect:

Dear Sirs, — A diploma entitling one as an architect can best be accomplished by comparison — that is, a competition in design out of which, say, 50 per cent of the best would be selected. This diploma would be very useful for draughtsmen to readily obtain good positions; though they should not be allowed to practise architecture unless they have a license which could only be obtained by a fixed technical examination, to be participated in only by those having a diploma.

A technical examination to ascertain the capability to practise architecture is not sufficient — a test in design should be considered first, as it is the essential: without that ability he cannot be an architect, and only those who possess this quality can rightly enter a technical or scientific examination entitling them to practise.

Those who at present practise architecture should be given a license at once without the process of competition and examination, though the license thus obtained should hold good only an equal number of years to which they have been in practise; though they be allowed at any time to contest for a diploma and license if they wish to show their ability to do so, or to avoid a delay when their license has run out. Nicholas Gillesheimer.

KELLER *VS.* THE N. Y., N. H. & H. RAILROAD.

To the Editors of the American Architect:

Dear Sirs, — Your editorial notice of the settlement of my suit against the New York, New Haven & Hartford Railroad Company is inaccurate in some points. My claim against the railway company was not because Messrs. Shepley, Rutan & Coolidge substantially appropriated my design, but that the railway company made use of plans made by me in Hanover, Germany, and were greatly benefited thereby, and then denied having used them, and refused to compensate me.

I produced in court an enlarged sworn copy, on tracing-cloth, of the plans used by the railway company, which, when placed against the window-pane of the court-room over a tracing of my plan, the two appeared as if but one, the lines coincided so exactly. At this the defence immediately offered to compromise, though previously the company refused point-blank to pay me a cent. As I am not a whole railroad company, and cannot afford to retain a swarm of lawyers, I was driven to accept their offer, and to submit to an injustice that I could not afford to struggle against.

I trust you will give this letter a place in your widely-read journal.

Respectfully, George Keller.

NOTES AND CLIPPINGS

Finds at Lycosura. — Dr. Waldstein writes from Athens to the correspondent of the London *Times* in Rome, Mr. Stillman, that the excavations of Mr. Cavvadias at Lycosura last summer have resulted in the discovery of the fragments of the group of Demeter and Despœna (Persephone) described by Pausanias (Arcadia VIII, 37), as he saw them in the Temple of Despœna, the statues and the throne on which they sat being of one piece of stone carved by Demophon. He says: "There can be no doubt that the temple he has excavated is that of Despœna, as described in Pausanias. The inside of the nave measures ten metres, and at the west end is almost (to about eight metres) taken up by the throne, upon which, according to Pausanias, were four figures — Demeter and Kore, with Artemis and Anytos. Of these statues nearly all the fragments apparently have been recovered. There are over a hundred fragments, most of which have already been brought here, though not unpacked and not visible to the public, while some of the torsos were so large that they could not be transported on the roads that exist there. Special arrangements will be made for transporting them soon. There are also a number of smaller figures, which apparently belong to the decorations of the thrones. All these are of excellent workmanship, pointing to the close of the fourth century B. C.; but what most struck me were some large fragments of drapery belonging to these colossal figures. The folding is beautifully free, and one piece is decorated with figures of Niké and Tritons in very flat relief, reminding one of gold repoussé work. There is one still larger fragment with flowers worked in similar relief. There can be no doubt that all this class of work is a reminiscence of the Greek gold and ivory statuary carried over to the marble work of the fourth century. I saw some five small figures, about one and one-half feet high, the bodies ending in fishes' tails, carrying large baskets on their heads, similar to the one, the large figure from Eleusis, in the Fitzwilliam collection at Cambridge has on her head. Cavvadias thinks that these were supports to the throne. I am not quite satisfied about this. We may hope to be able to complete nearly the whole composition. What makes this one of the most important discoveries yet made is that we have here an original *agalma*, a genuine temple statue of a good Greek period which we can identify with a noted artist, Demophon of Messene, the most celebrated artist of that city, who flourished about the one hundred and second Olympiad."

Working-hours Abroad. — A Turkish working-day lasts from sunrise to sunset, with certain intervals for refreshments and repose. In Montenegro the day-laborer begins work between 5 and 6 in the morning, knocks off at 8 for half an hour, works on till noon, rests until 2, and then labors on until sunset. This is in summer. In winter he commences work at 7.30 or 8, rests from 12 to 1, and works uninterruptedly from that time to sunset. The rules respecting skilled labor are theoretically the same, but considerable laxity prevails in practice. In Servia the principle of individual convenience rules in every case. In Portugal from sunrise to sunset is the usual length of the working-day. With field laborers and workmen in the building trades the summer working-day begins at 4.30 or 5 in the morning and ends at 7 in the evening, two or three hours' rest being taken in the middle of the day. In winter the hours are from 7.30 to 5, with a shorter interval of repose. In manufactories the rule is twelve hours in summer and ten in winter, with an hour and one-half allowed for meals. Eleven hours is the average day's labor in Belgium, but brewers' men work from ten to seventeen hours; brickmakers, sixteen; the cabinet-makers of Brussels and Ghent are often at work seventeen hours a day; tramway drivers are on duty from fifteen to seventeen hours, with an hour and one-half off at noon; railway guards sometimes know what it is to work nineteen and one-half hours at a stretch, and in the mining districts women are often kept at truck-loading and similar heavy labor for thirteen or fourteen hours. The normal workday throughout Saxony is thirteen hours, with two hours allowance for meal-taking. In Baden the medium duration of labor is from ten to twelve hours; but in some cases it far exceeds this, often rising to fifteen hours in stoneware and china works and cotton-mills; in saw-mills to seventeen hours; while the workers in the sugar-refineries, where the shift system is in vogue, work for twenty-four hours and then have twenty-four hours free, and in too many of the Baden factories Sunday work is the rule. In Russian industrial establishments the difference in the working-hours is something extraordinary, varying from six to twenty. It is remarkable that these great divergences occur in the same branches of industry within the same inspector's district and among establishments whose produce realizes the same market price. — *Chambers's Journal.*

Future of Glass in Mechanics. — In a recent attempt to determine the place that will ultimately be occupied by vitreous substances in mechanics, it is stated that M. de la Basile, a French chemist, has, during the past few years, conducted a series of experiments which have resulted in a method of rendering glass sufficiently tough for use in moulding many articles hitherto made of iron. It is premised that the huge, sub-Atlantic, pneumatic tube, for the connection of the old with the new world, the suggestion of which was received with indifference and incredulity some time ago, many eventually turn out to be not so chimerical as at first glance it was judged to be. A glass car fitted into a tube of the same material would spin away at an incredibly fast rate. No appreciable heat would be generated, and the great hardness and smoothness of the material would greatly lessen the retarding influence of friction, which will be one of the most important considerations in all systems of future rapid transit. — *New York Commercial Advertiser.*

Marble in Oregon. — The find which has been recently reported of an extensive body of a rare species of variegated marble, resembling onyx, in Douglas county, in the southern part of Oregon, is a very remarkable one. The vein has been traced for thirty miles, and already a marble-cutting mill run by water-power has been set in operation, capable of cutting slabs of three to six feet square, of any thickness. The marble shows itself in immense tiers, one above the other, perfectly bare, to a height of 500 feet. From these wonderful cliffs of pure marble any sized blocks can be quarried without a week's work in clearing. — *Pittsburgh Dispatch.*

Lifting a River. — A triumph of engineering is reported from California in the lifting of the Feather River, a fast-flowing stream, fifty feet, and carrying it for more than half a mile, in an artificial bed, at that height above its old channel. It has been accomplished in a little less than a year. The object was to drain the river near Oreville, in order to reach the rich gold deposits believed to exist in its bed. — *New York Commercial Advertiser.*

S. J. Parkhill & Co., Printers, Boston.

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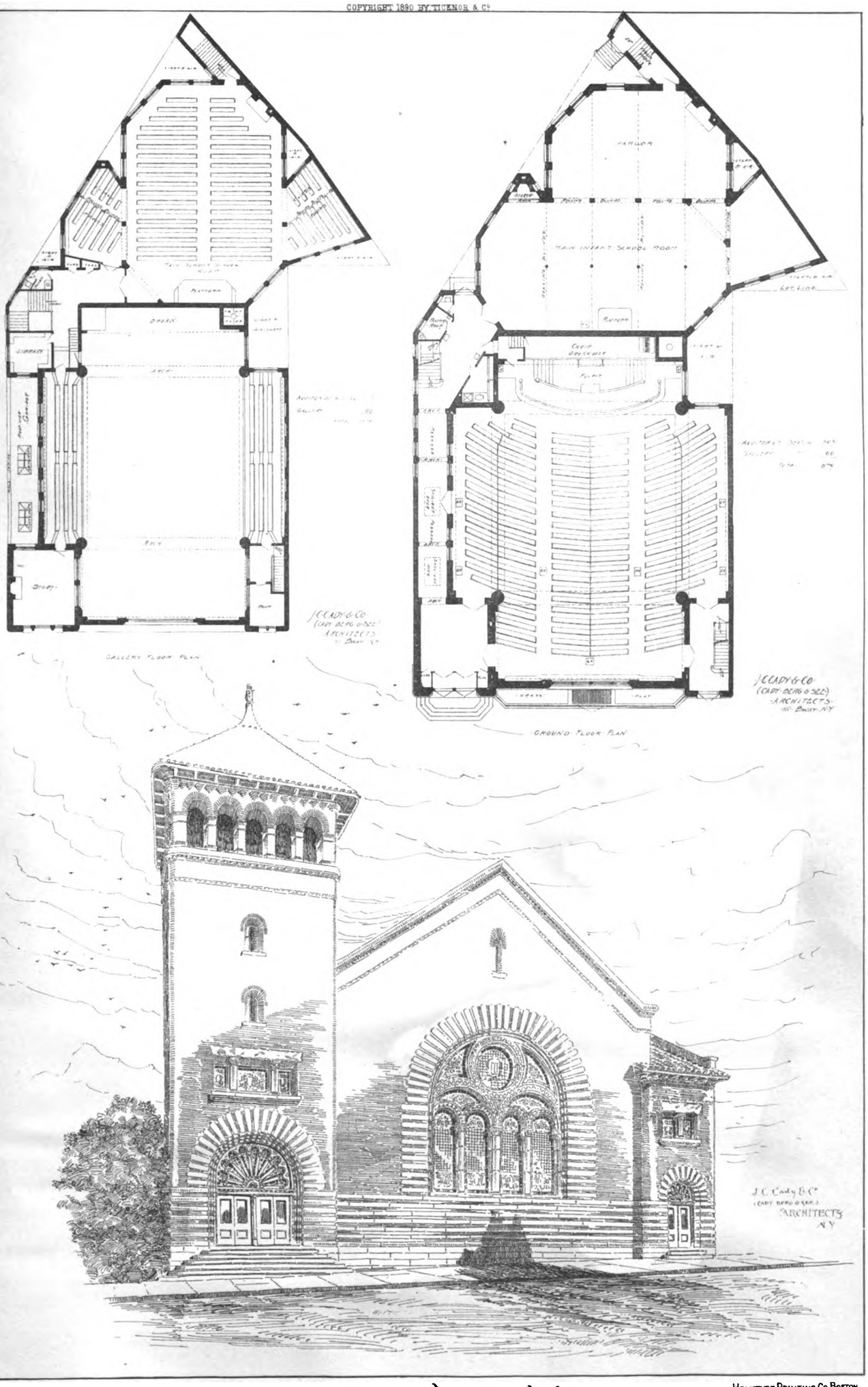
GALLERY FLOOR PLAN
J.C. CADY & CO (CADY, BERG & SEE) ARCHITECTS 111 BWAY, N.Y.
MAIN INFANT SCHOOL ROOM
PARLOR
GROUND FLOOR PLAN
J.C. CADY & CO (CADY, BERG & SEE) ARCHITECTS 111 BWAY, N.Y.
J.C. Cady & Co (Cady, Berg & See) ARCHITECTS N.Y.

Perspective View of Grace M.E. Church.

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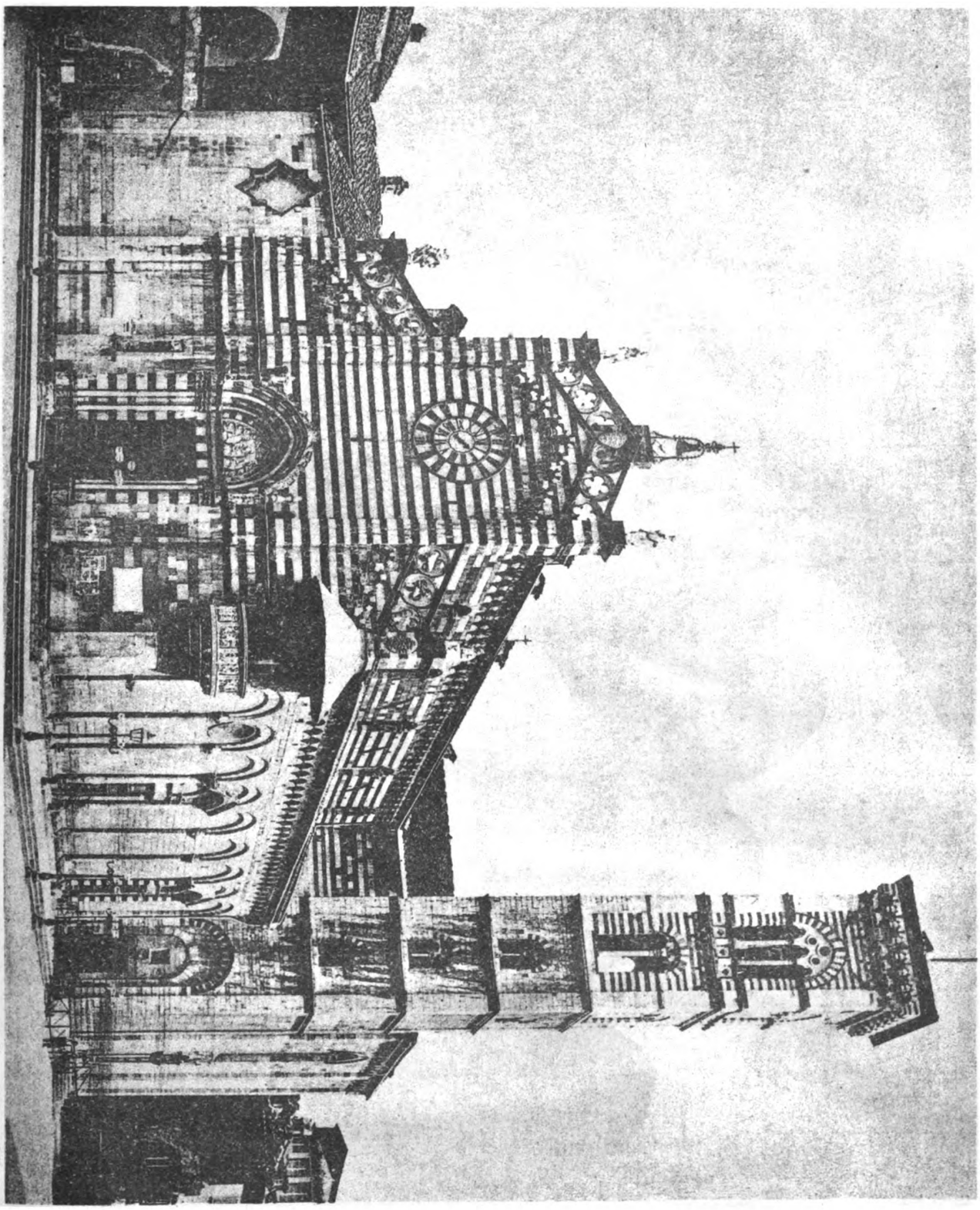

THE CATHEDRAL, PRATO, ITALY.

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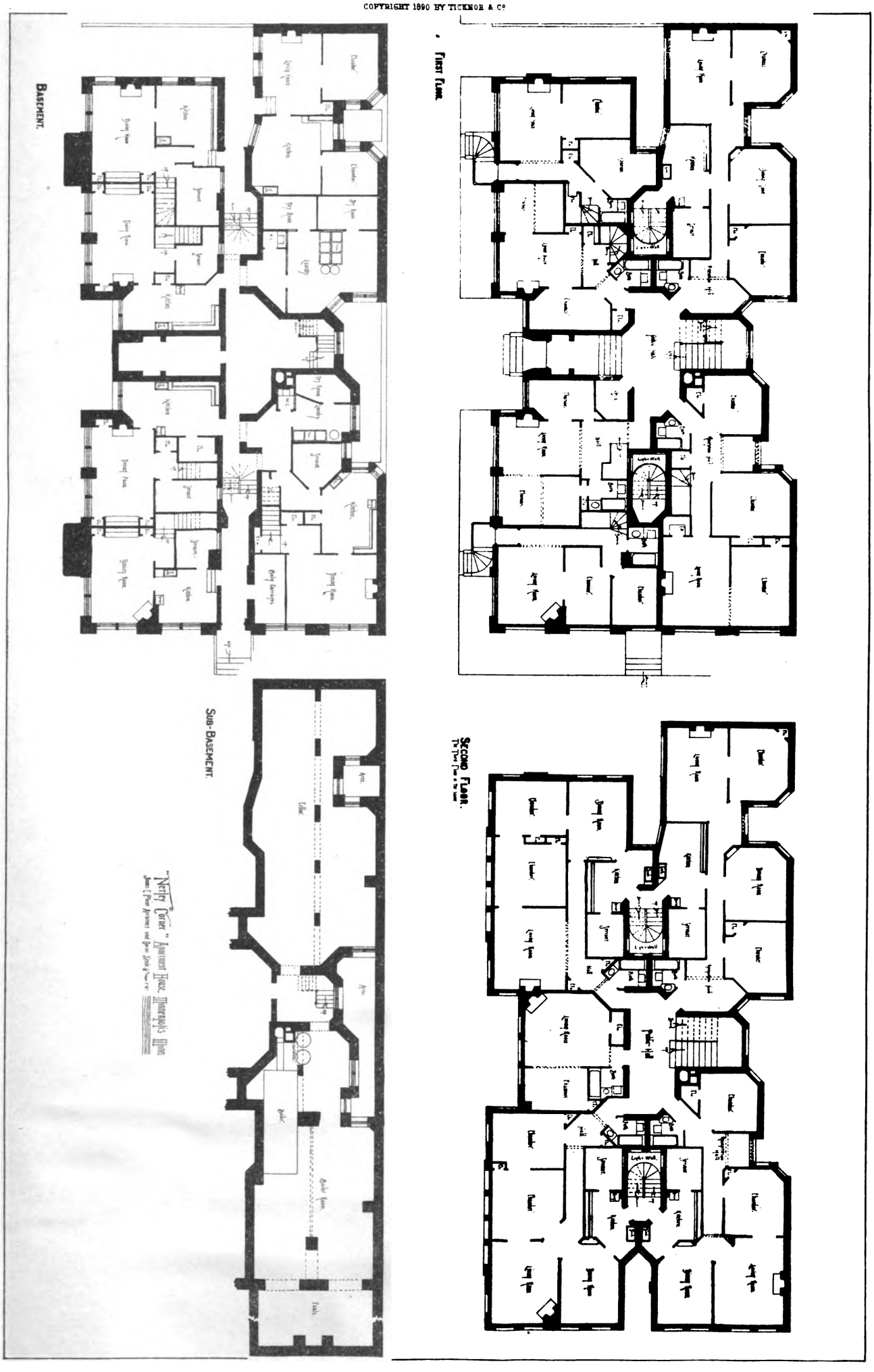

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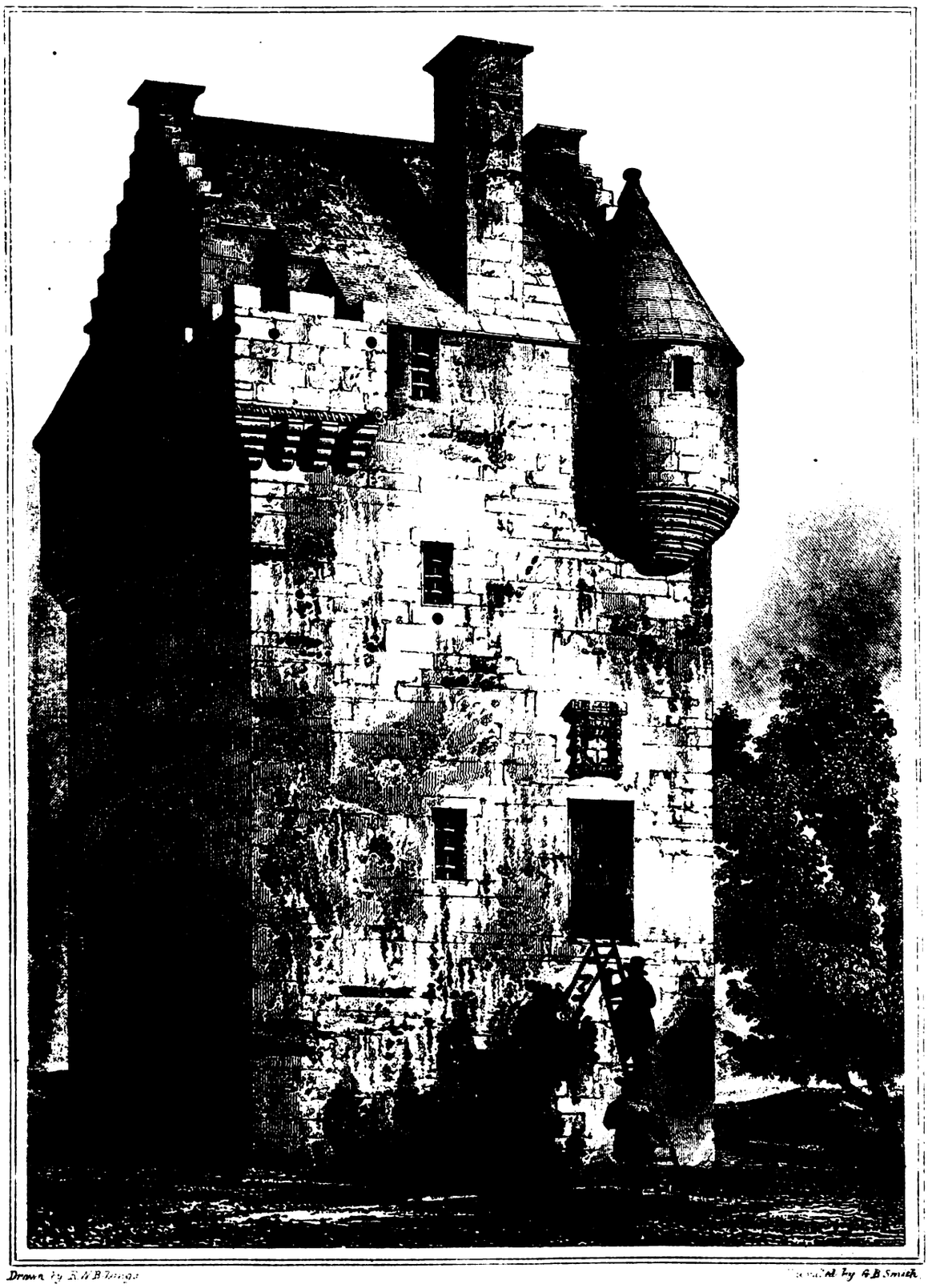

Drawn by E. H. B. Jones. Engraved by G. B. Smith.

CORTON TOWER NEAR ELGIN

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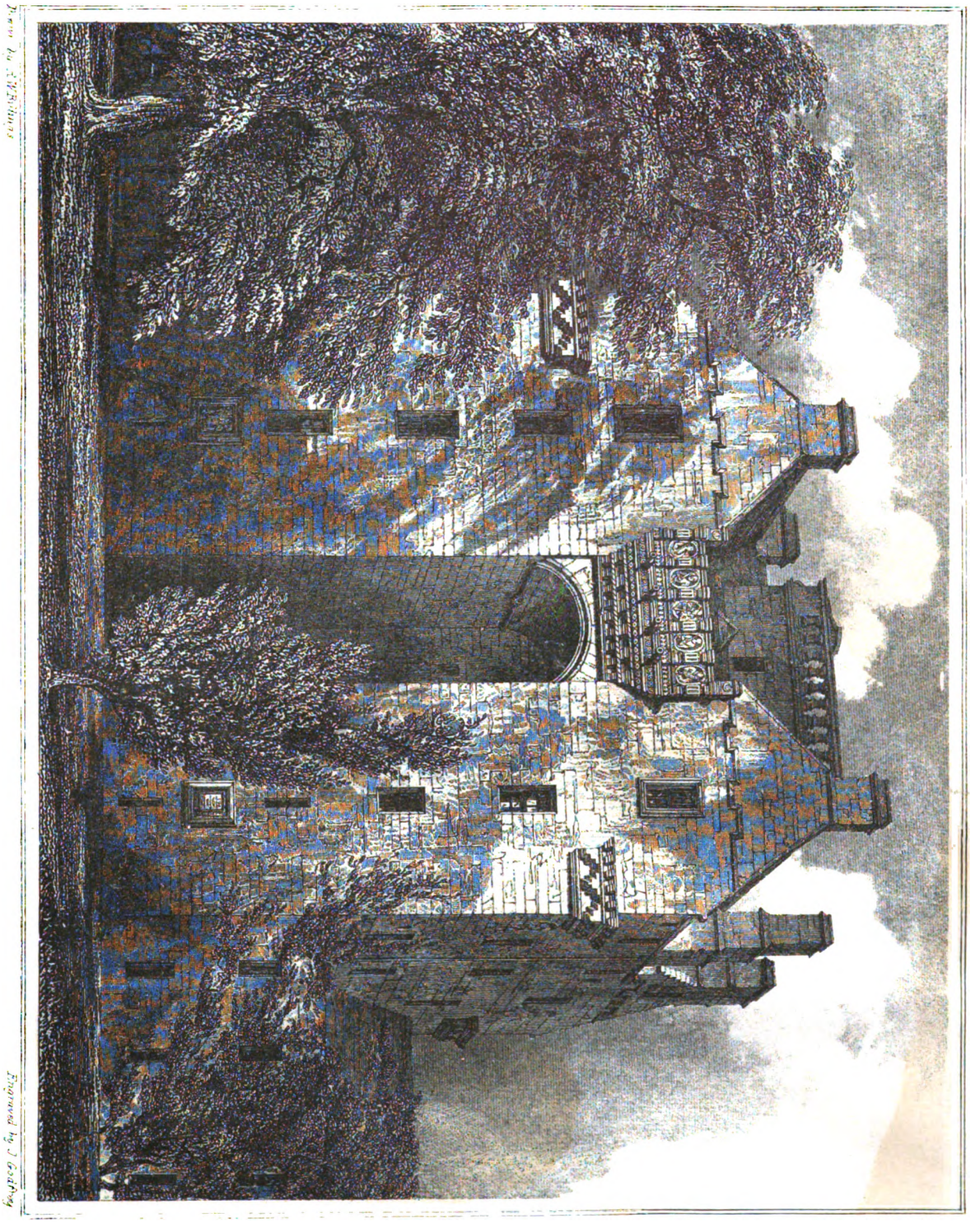

Drawn by J.W. Wilson

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RAGLAN CASTLE

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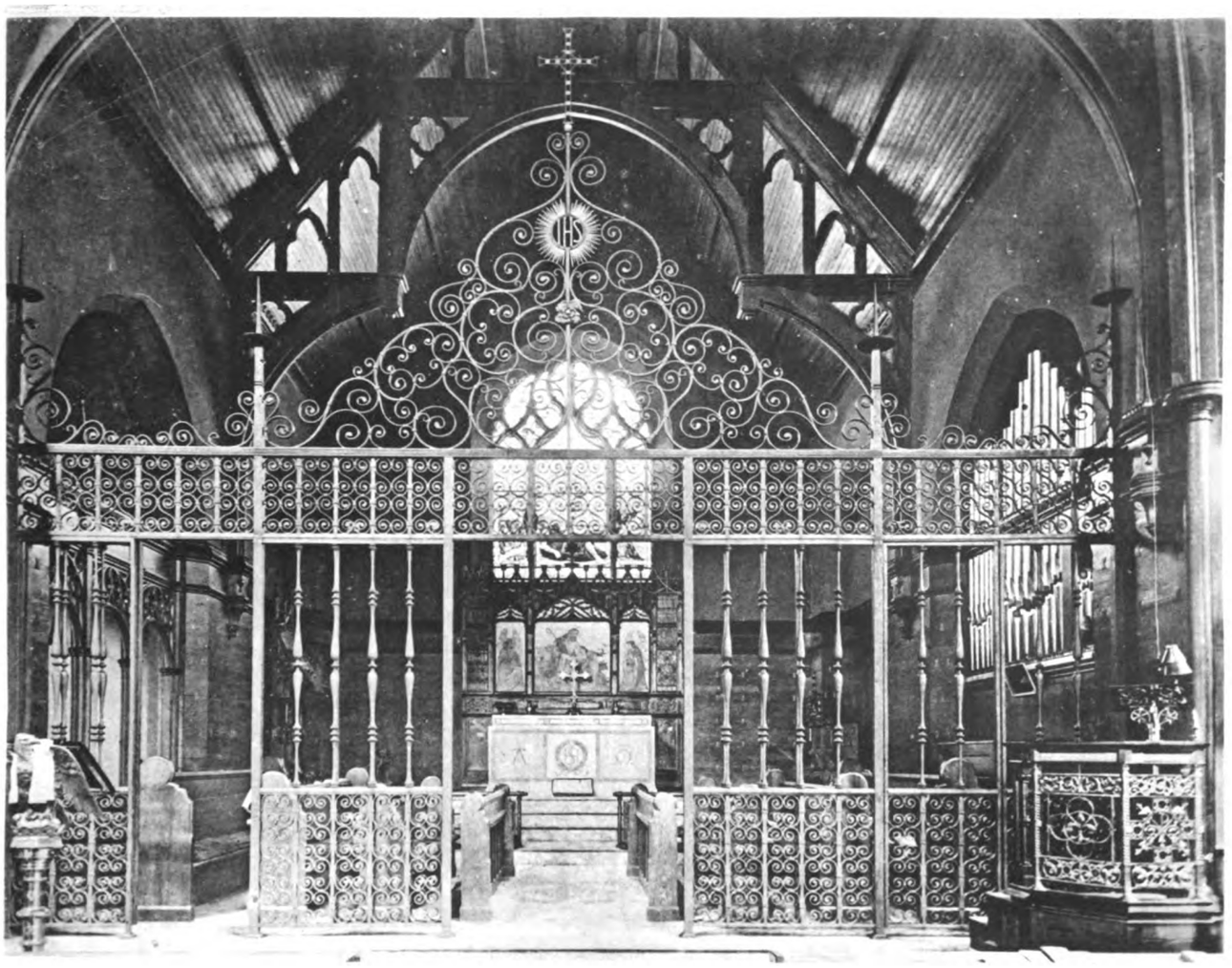

ALL WROUGHT IRON ROOD SCREEN IN BETHESDA CHURCH, SARATOGA SPRINGS.

Designed by A. Page Brown. Executed by Jno. Williams, New York.

ADVERTISING PAGE

HELIOTYPE PRINTING CO., BOSTON

DOUBLE CARRIAGE GATES IN NEWPORT, R. I.

Designed and made by Jno. Williams, New York.

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⋈ DESCRIPTION OF THE CONSTRUCTION ⋈

——————OF THE——————

Patent "PERFECT" BOWLING ALLEY.

The alley bed consists of several sections from 10 to 12 feet in length. The sections are joined at the head ends by hardwood tongues and groves. Each section is composed of a number of maple or hardpine strips, set on edge and firmly glued and spiked together, with a joint in the center, dividing each section into two halves from 20 — 24 inches in width, thus enabling to run same through a planer. Both halves are held together by 5/8" iron tierods about 3' 6" from center.

The sections of the alley bed are supported by cross pieces or girders, which can be of wood (System A) or of T iron (System B). The superiority of System B consists in the iron girders which are not affected by dry rot and by saving about 5 inches in the height of the girders, which is of advantage in low rooms. The cost of System B is about $1 more per running foot than System A.

Iron cleats are screwed to the underside of the alley sections, catching the flanges of the girders, thus holding the alley bed firmly to the same.

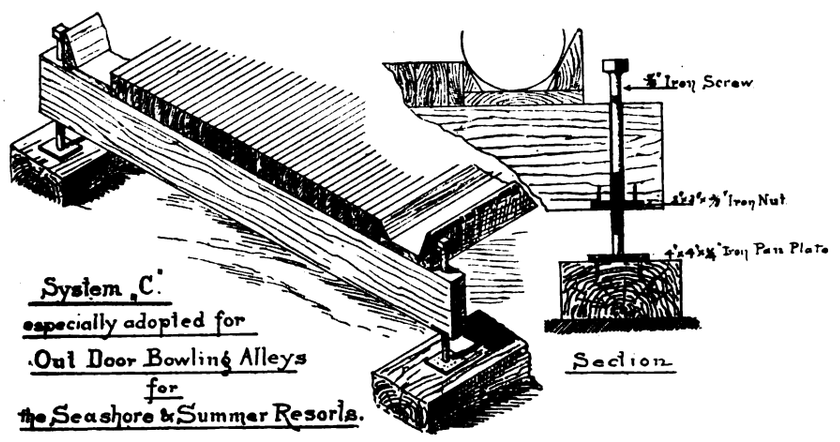
The girders are hung on iron rods with thread, two nuts and washers, to raise the alley to its desired level or force it down, as necessary.

The iron rods rest with the upper nuts on the top board of the wooden boxing; the nut below same will prevent the iron rod to move upward in case the alley or the girder should warp. Slits are cut in the sides of boxing to give access to the nut below top board. The boxings consist of the heavy top plank, resting on studs and boxed up on the sides. The studs rest on a 4" x 4" sill.

On each side of the alley bed are gutter planks laid 1½ inches deeper with beveled strips nailed in the corners. At the players' end a center board, constructed in same way as alley bed, is set flush with the floor.

All balls must be started on this board.

The construction of ball run, receiver, swinging cushion, etc., is clearly shown in the drawing. By raising the alley bed towards the pins, from 1½ to 2 inches, the friction of the balls is increased, preventing the balls running off too quickly.



System C.

Description.

System "C" is perfectly adapted for the temporary use at summer resorts and on the seashore, especially for out-door use. The construction is very simple and the alley can be easily adjusted by the screws resting on iron pan plates.

For foundation, any 4 x 6 or 4 x 8 timber will answer. The cost of this alley is about $2 less than System "A" with wooden girders, and $3 less than System "B" with iron girders, per running foot.

For further information, etc., apply to

REISKY & WOLFF, 321 N. St. Paul Street, Rochester, N. Y.

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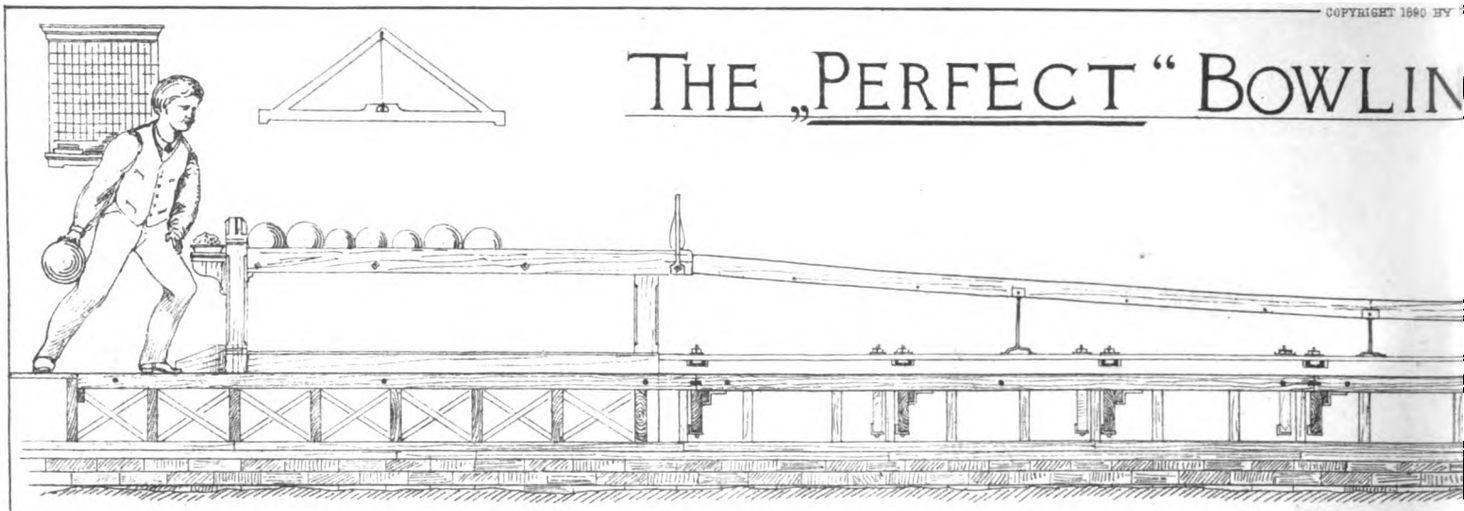
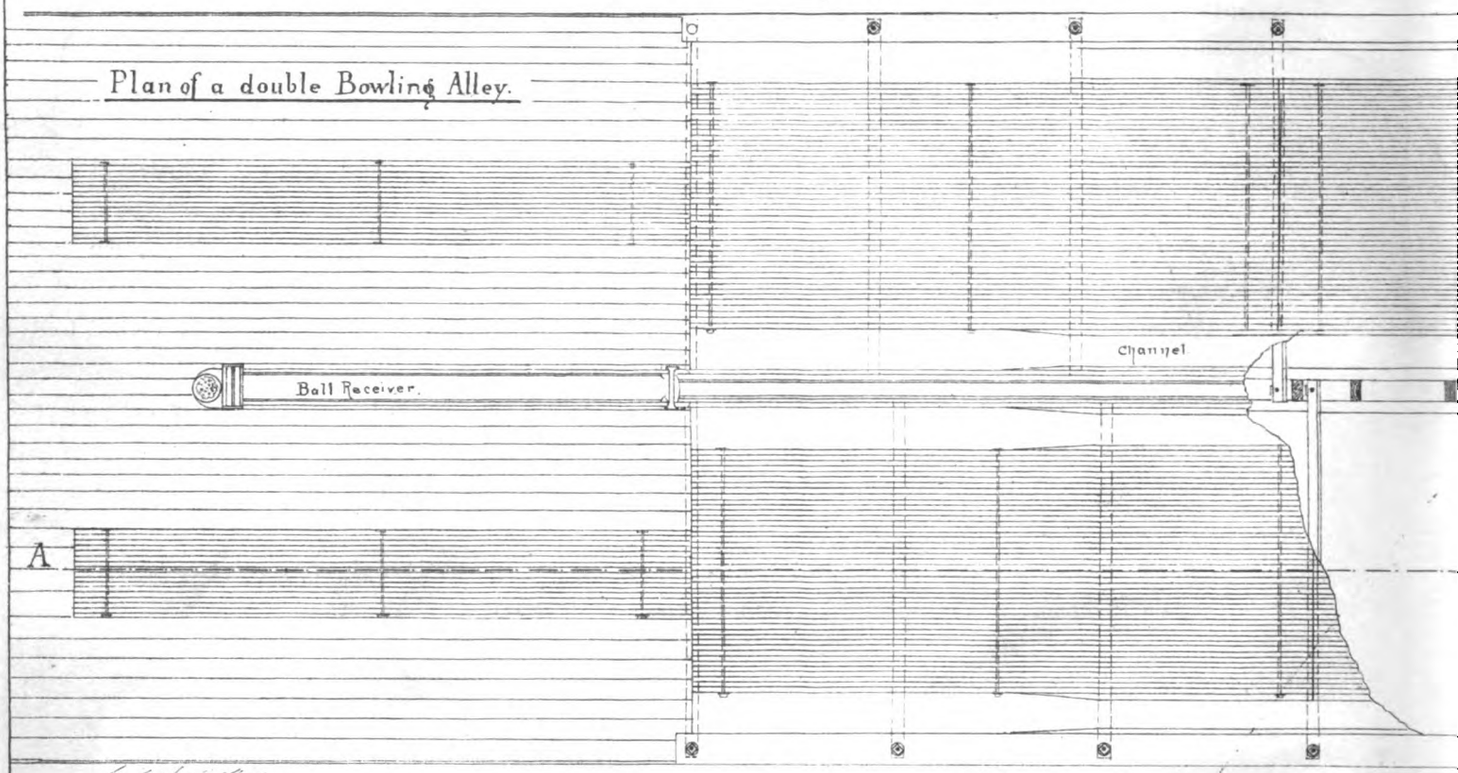
THE „PERFECT" BOWLIN

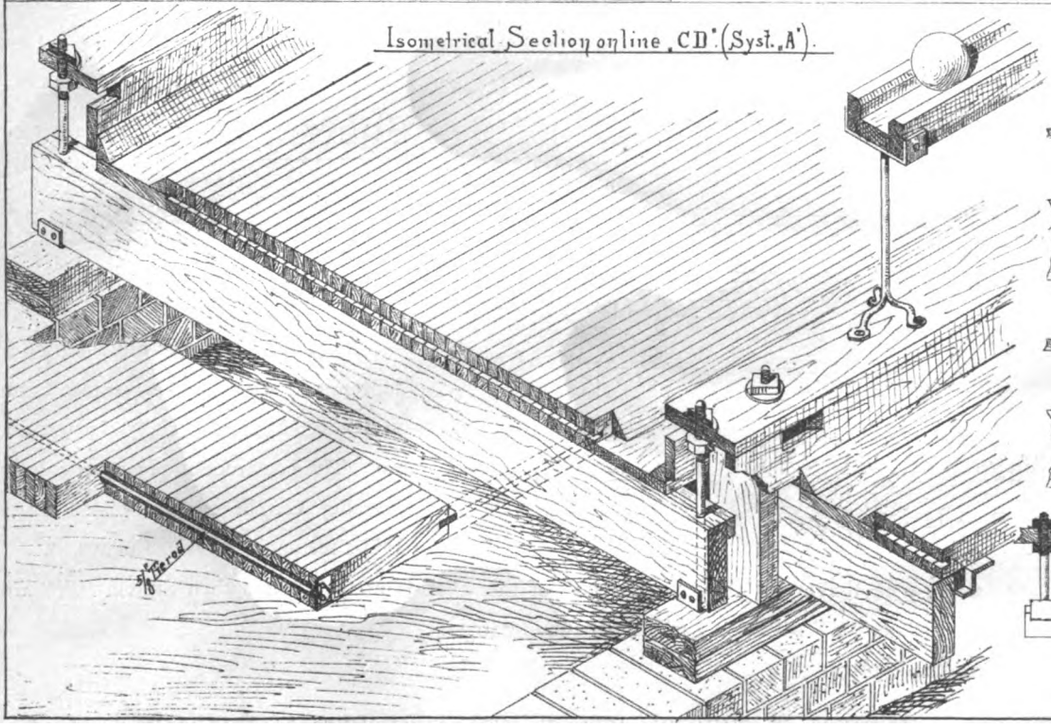


System „A" with wood Girders.

Plan of a double Bowling Alley.



Isometrical Section on line „CD" (Syst. „A").



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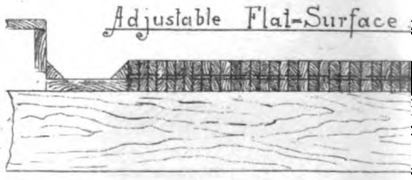

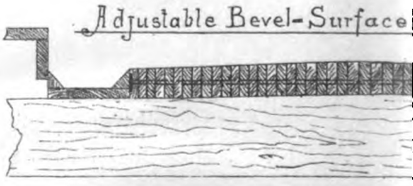

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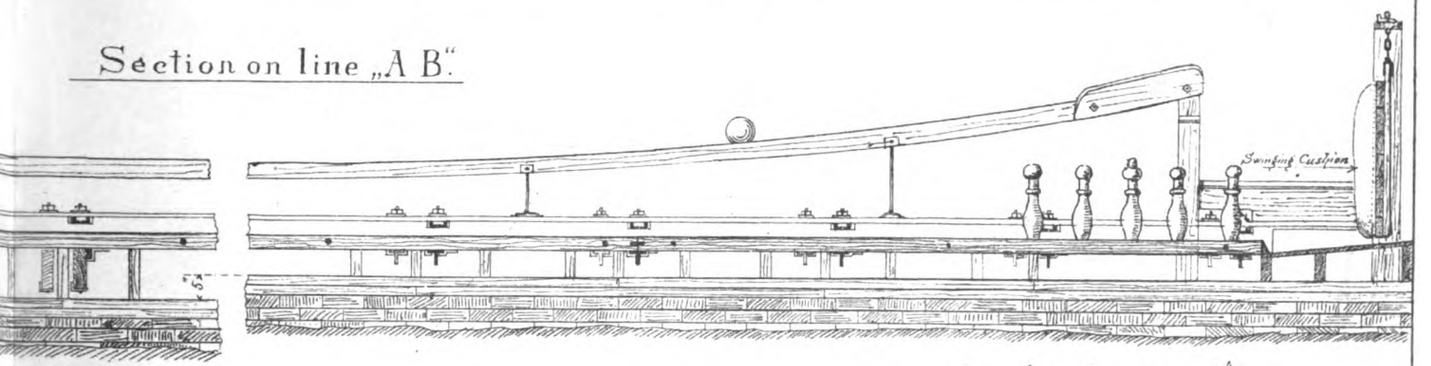
T. NICHOLS & Co.

NG ALLEY.

Pat. No. 350542 Oct. 7 84.

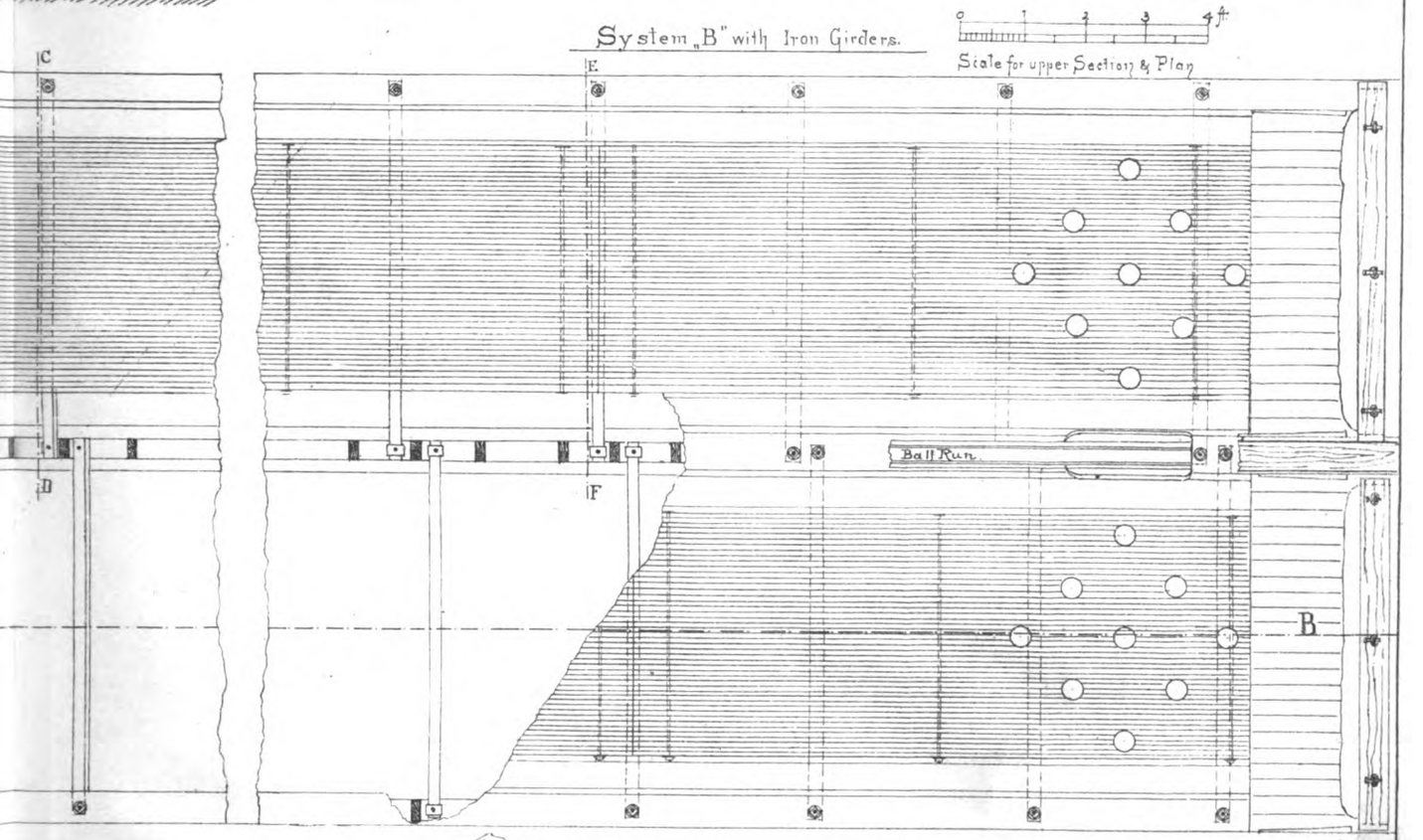
Reisky & Wolff 321 N. St. Paul St. Rochester. N.Y.

Section on line „A B".



System „B" with Iron Girders.

Scale for upper Section & Plan



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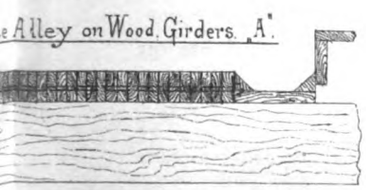

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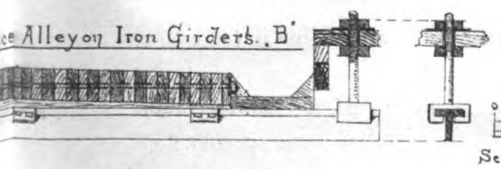

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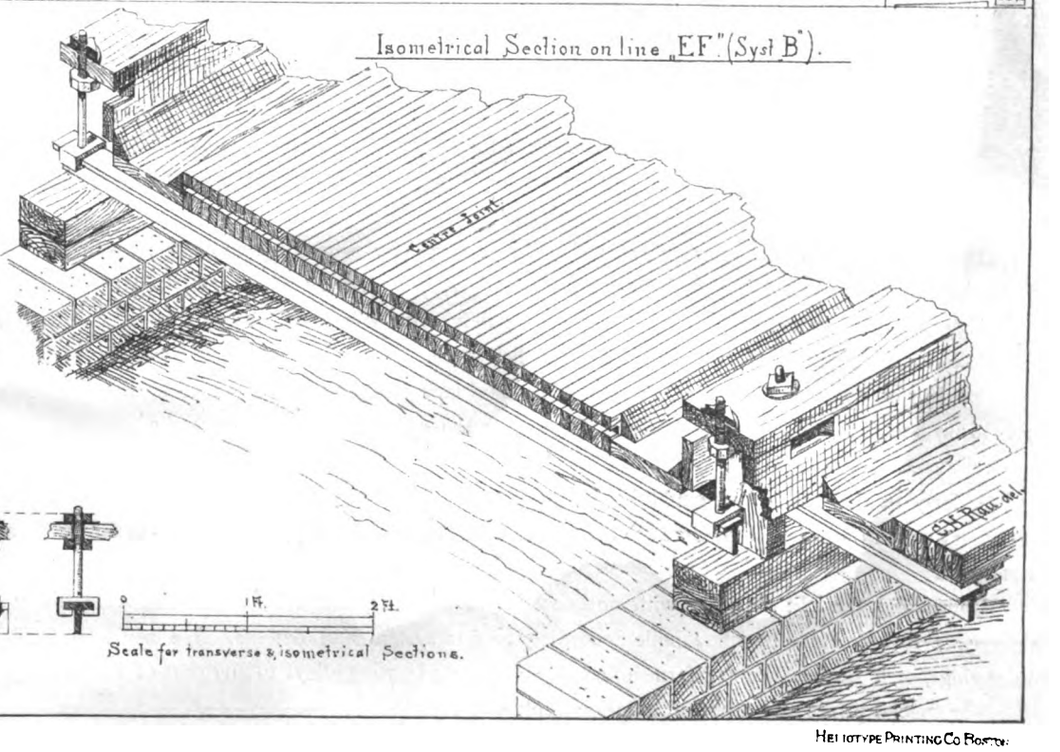

Scale for transverse & isometrical Sections.

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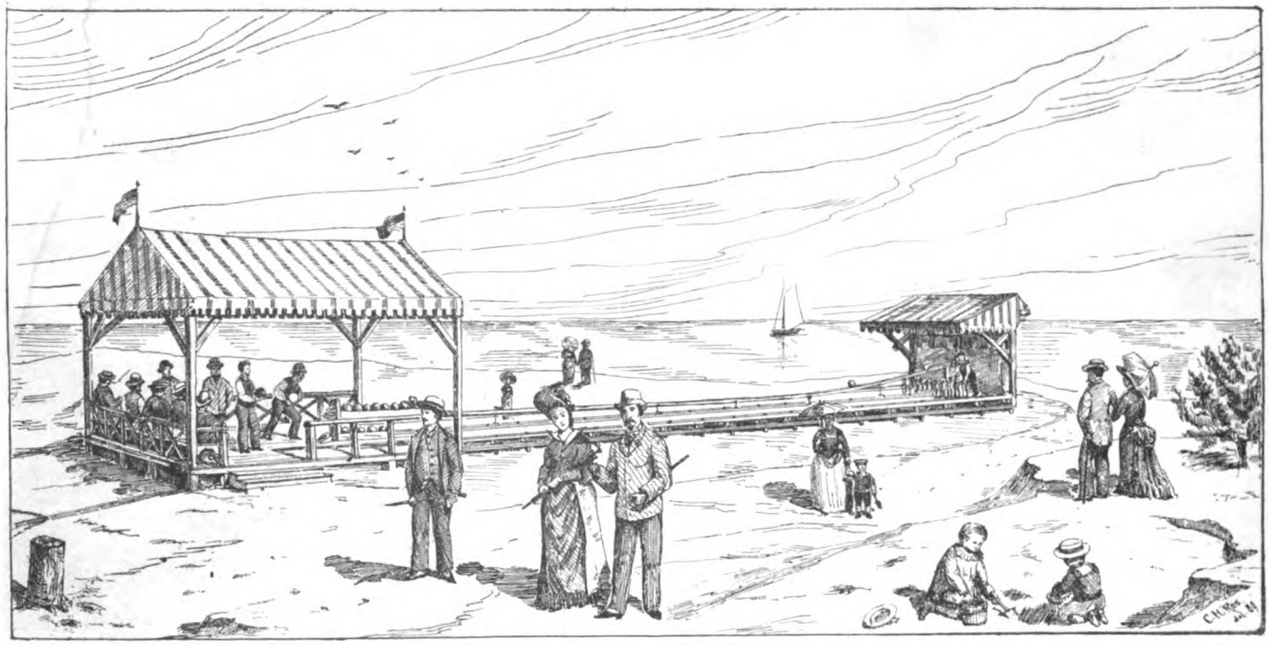

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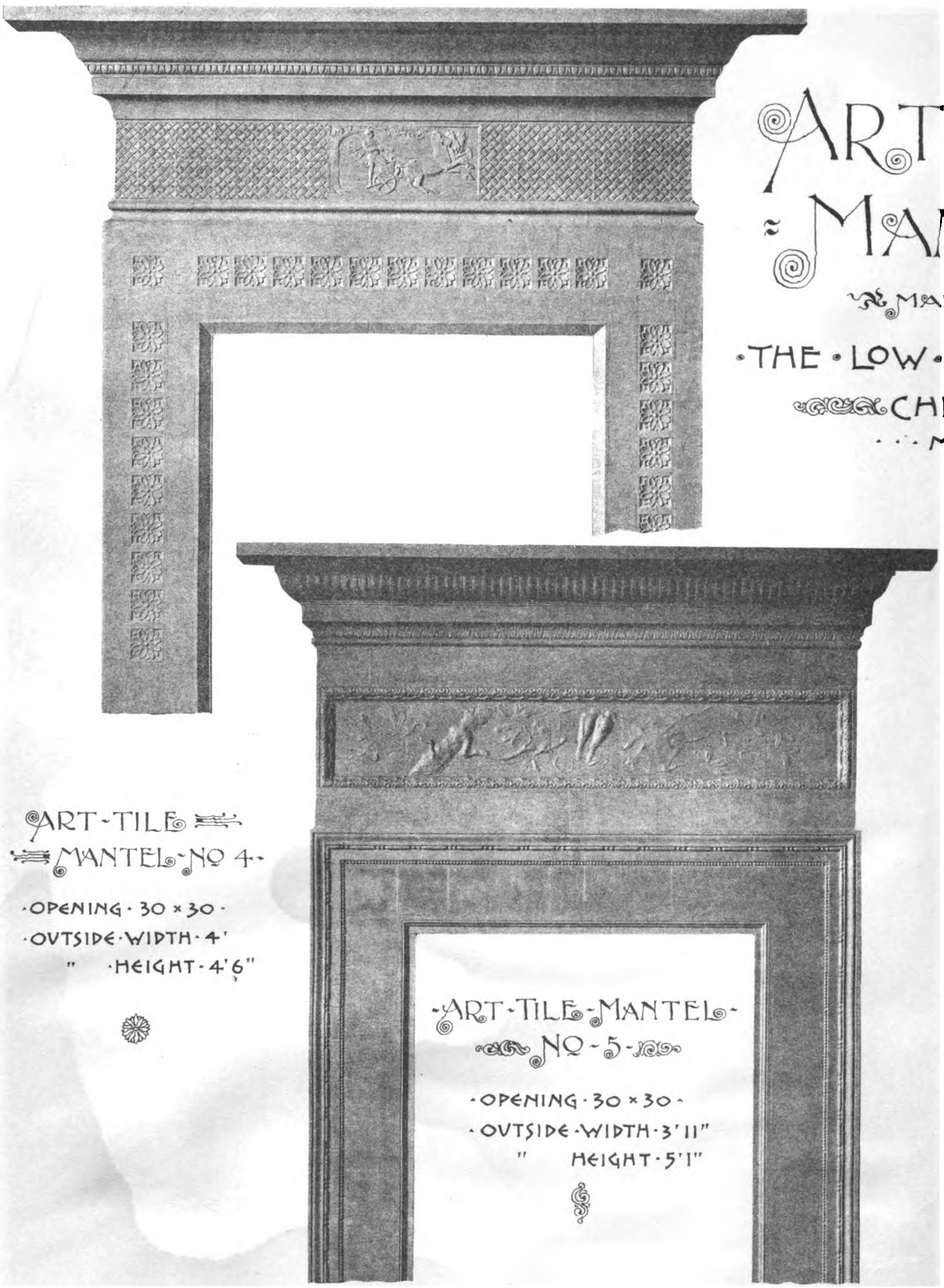

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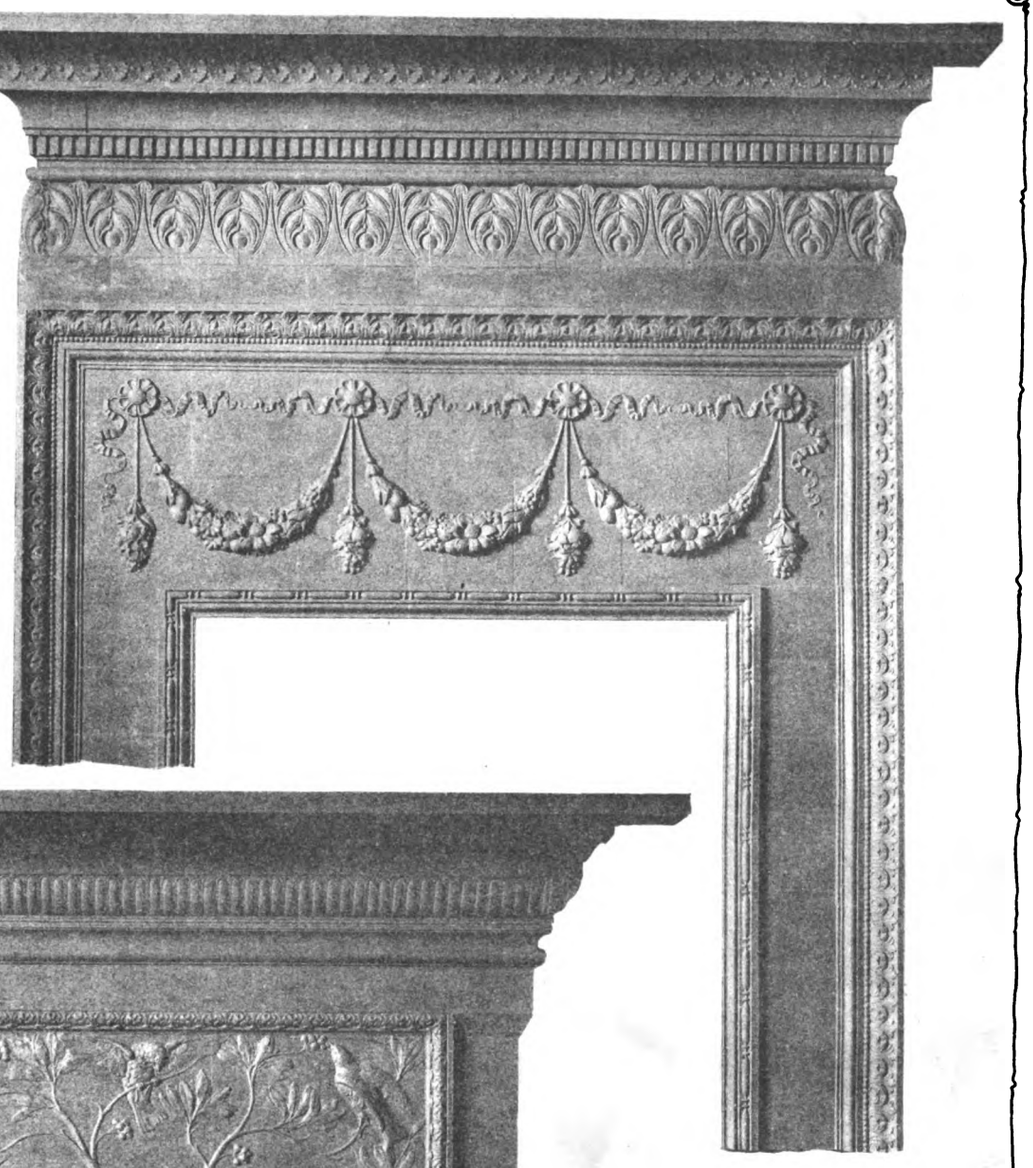

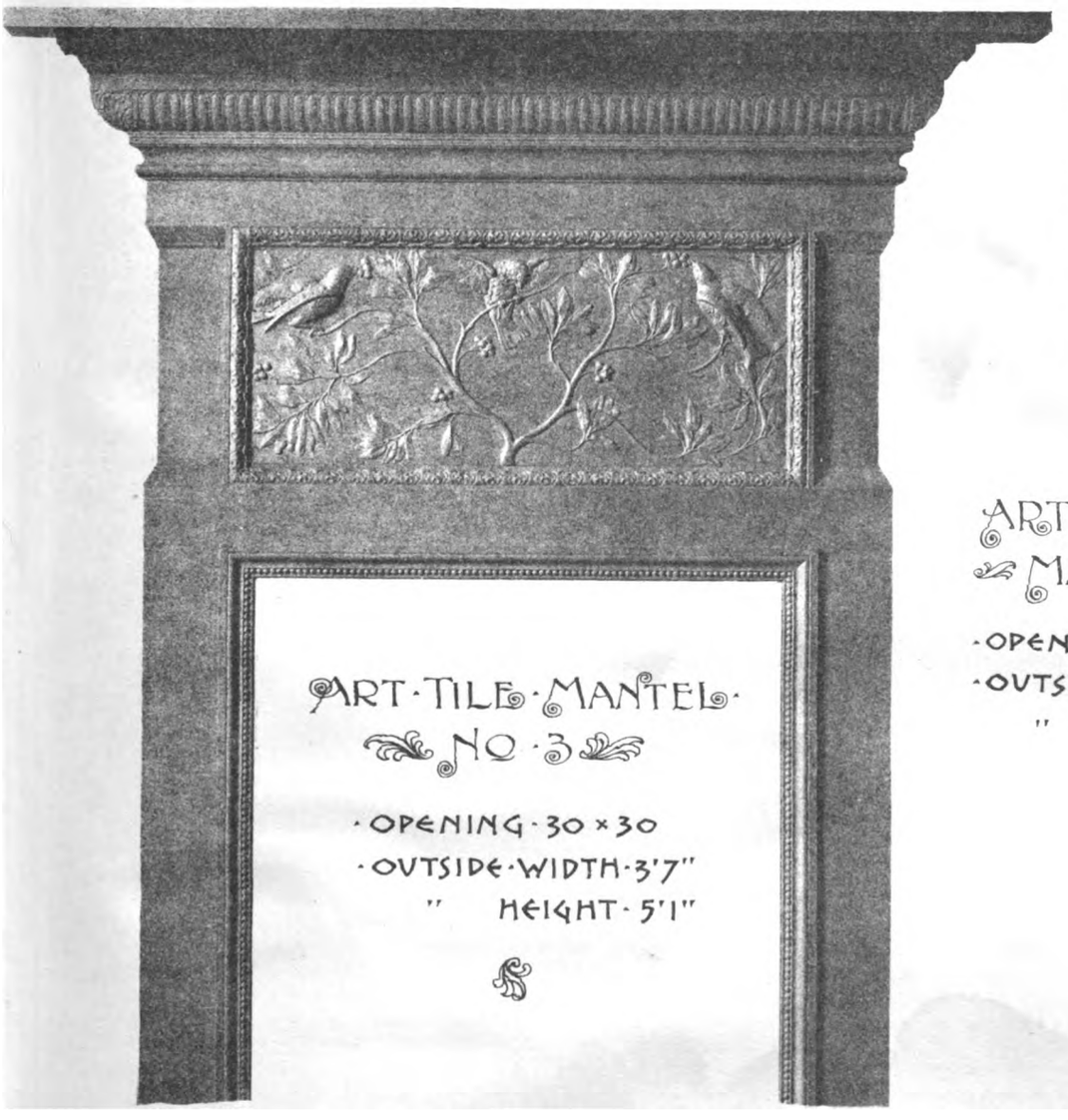

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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A GREAT deal of discussion is going on just now everywhere about the expediency of having architects examined, and furnished with some sort of certificate or diploma, before allowing them to practise their profession. In this country, the local associations of architects of several States have taken up the matter, and are urging the adoption of statutes requiring such examination. In England, a recent attempt to secure legislation of the kind, which was made with very little thought, and without the coöperation of any architects of reputation, failed, but the compulsory examination for admission to the Royal Institute of British Architects is quietly, but surely, weeding out the pretenders from the men of attainment and skill, and giving the latter a recognized position. In France, a Government Commission has been appointed to consider and report upon the subject, and the technical journals are full of letters from architects and others, with suggestions of all sorts. Among the rest is a letter in *La Semaine des Constructeurs*, from "an old proprietor," which is not only written with a force, and an evident familiarity with building matters, which renders it extremely interesting, but is particularly valuable as indicating the feeling of the public, outside the profession, toward the proposed scheme for certifying by diploma the competency of architects. To begin by quoting the end of the letter, the "old proprietor" very strongly favors the examination of architects before they are allowed to practise. "We proprietors," he says, "cannot examine our architects for ourselves. If we could, we should certainly do so, but, not having the necessary knowledge, we must look to the public authority to assure us that the men whom that authority permits to act as architects for other people understand their business." "The Municipal Council of Paris," he goes on to say, "requires all hackmen to pass a satisfactory examination as to their knowledge of the geography of the city before they are licensed to convey passengers; physicians and lawyers have to prove their competency before experts before they are allowed to practise"; yet he is told that to ascertain, and give the public the means of knowing, whether a so-called architect knows a cellar from a garret, would be a task of "extreme difficulty," that "the community would rebel," that "great artists would have less scope for their genius," and so on. When he hears this, he says, he makes no reply, but goes home sadly, and turns over the pages of his old account-books, the "eloquent witnesses" of the troubles into which incompetent architects can get their clients, and of which he describes some samples.

THE writer of the letter speaks of himself as a man who had always had a good deal of money, accompanied with a passion for building, which has brought him an unusual experience of architects. He is considerate enough not to say much about his personal misfortunes, but he gives a lively description of an incident which occurred to one of his friends. Our readers, by the way, will bear in mind that it is not an architect, but a proprietor, who tells the story. This friend came to him one day in an excited state of mind, and said that he had been building an addition to his house. "Mr. N., the experienced old architect, came to me," he said, "and proposed to make the plans and direct the execution merely for the love of art." "There was to be no five per cent, nothing but a little present to Mrs. N., and I accepted his offer. This morning," he continued, "a terrific noise, accompanied by a dazzling light, awakened me. I leaped out of bed, and found that the whole side of my chamber, which adjoined the new addition, was open. The addition had fallen down!" "Well," said *La Semaine's* correspondent, "and what are you going to do?" "There is nothing to do," replied the victim, "but to claim damages from the rascally contractor. Poor N. is overwhelmed with grief, and, besides, he did the work gratuitously." The matter was carried into the courts. The owner of the collapsed building sued the contractor, and the contractor sued the architect. There was an expert examination, which proved that the disaster was caused partly by the bad quality of the mortar, and partly by the unskilful planning, through which the walls were dangerously weakened by flues. The architect defended himself from responsibility on the ground that his services were gratuitous, whereupon the contractor caused a sensation in the court by remarking: "Yes, gratuitous for the proprietor, but not for me. You forget the ten per cent that I was to pay you!" It turned out, on investigation, that the "experienced old architect" was formerly a shopkeeper, who had made some money, and spent it in building speculations. By looking on at his building operations so long, he had come to imagine that he knew something of construction, and then, by an easy transition, after his money was all gone, gave himself out as an architect, and made plans for his acquaintances, finding his reward either in "pure love of art," or in other compensations, as the case might be.

ON another occasion, the "old proprietor," who thinks of building in the town of B, mentions the matter to the mayor, who is a friend of his. The mayor knows an architect, who is just the man he wants. He will arrange a little lunch, so that the two can meet. The lunch is prepared, and the architect, a man of considerable local reputation, decorated with the Legion of Honor, appears. The "old proprietor," who is fond of equestrian similes, "rears" a little when he sees the professional man with rings in his ears, and notices that he has difficulty in managing his knife and fork, and lacks a good deal of perfect elegance of expression. However, he may be stronger in art than in literature, and he asks him which style he likes best, that of Duc or Garnier? The distinguished architect laughs. "Oh," he says, "I don't pretend to know much about your theory, but no one can get ahead of me on practice." The mayor speaks up for his friend, "X," he says, "is not himself an artist, but he is very successful, and employs the best designers." The "old proprietor" avoids further connection with the distinguished architect, and learns that he was once a journeyman mason; then a contractor, and finally an architect; that he signs the drawings that he gives out as his own work, hastens to settle and hush up any claim against him for damages for incompetency, and enjoys a large business and extensive influence, or rather, did enjoy it until his quality was found out, for the letter says that he fell later into disrepute, and was reduced to the business of advancing money at high interest, to small contractors. Architects will think that this particular "old proprietor" must have been a man of unusual discernment to escape the attractions of the successful ex-mason; but this is not so certain. Many other

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proprietors have, he says, learned the lesson that the best policy in building is to employ contractors who give good materials, well put together, at reasonable prices, and strictly according to their agreement, rather than those who expect to gain by substituting inferior materials and workmanship for those called for by the contract, and whose eye is always in search of flaws in the specifications, from which to extract profit; and, moreover, that contractor and owner can work to their mutual satisfaction and advantage only when they have the benefit of the services of an architect of skill, experience and honor. Under such an architect, the plans and specifications will be complete, well considered and precise; the contractor will know just what materials to get, how many men he will have to employ, what will be expected of him under his contract; and he can, and will, carry out his agreement economically for himself, and to the satisfaction of the owner; while, with an ignorant or careless architect, the plans or specifications will be defective; the contractor does not know, when the time comes, what is expected of him; when he asks for instructions, the architect hesitates, or gives contradictory or erroneous directions, which cause further trouble; work is done and undone, materials are spoiled, time is lost, and the result is unsatisfactory, as well as expensive, even if the architect's intentions are good; while, if his sense of honor is feebly developed, he is likely to try to hide his own omissions by consenting to serious violations of the contract at his client's expense.

NOW that so many architects and students, young and old, are making preparations for a summer trip abroad, it may not be amiss to remind them of the most important new architectural works now going on, or recently completed, which it will be for their advantage to see. As every traveller knows, the time to make a memorandum of what to look at is before one starts from home. After arriving on the other side of the ocean there is little opportunity for learning about the newer buildings. Those mentioned in Baedeker can be hunted up, and duly inspected; but the architectural tourist, unless he stumbles upon a new construction by chance, is apt to miss it altogether. Beginning with England, the traveller landing at Liverpool should visit the Mersey Tunnel, and, if he has a taste for engineering, the Manchester Ship-canal. After this, the most interesting modern work, outside of London, is to be found in Oxford and Cambridge, where good building is always going on, and, the size of the two towns being limited, can always be readily found. The largest new building belonging to either University, although not extremely recent, is the Examination Schools at Oxford, by Mr. T. G. Jackson, which deserves long and careful study; but there are charming new colleges, and additions to old ones, at both places. In London, the most important recent work is to be found at South Kensington, Chelsea, and on the Thames Embankments, and among the Government Buildings at Whitehall. A great deal of beautiful architecture is also to be found in the London suburbs, particularly to the northward, about Hampstead, westerly, around Chiswick and Putney, and in the neighborhood of Bedford Park, and southerly, at Sydenham.

ON the Continent, Paris is usually the first place to which the student turns for modern architecture, after he is tired of sketching picturesque antiquity in Normandy or Picardy; and there is plenty of it to be found. The most important single new building is perhaps Nénot's addition to the College of the Sorbonne, near the Pantheon, which is now receiving the final decoration. Next to this, Ginain's Ecole de Medecine, comprising a splendid façade on the Boulevard St. Germain, and a group of buildings extending up the hill toward the Pantheon, is the most interesting new work; and the Pantheon itself, in which there is always some great historical fresco-painting going on, should be visited before leaving the neighborhood. Not very far off from these is the Jardin des Plantes, with André's great Musée d'Histoire Naturelle, which is barely completed. On the north of the Seine, the new Hôtel des Postes, near the Palais Royal, is interesting, partly from the savage criticism which has been directed at its plan, and, beyond the Opéra, is the "Printemps," Sedille's splendid dry-goods store, on the way to which is the pretty Eden-Theatre. Westerly from the "Printemps" is the Parc Monceaux, around which lies the beautiful "English quarter." Abadie's enormous church of the Sacré Cœur, on the heights of Montmartre, directly north from the Boulevard des Italiens, but at a considerable distance, and the Exhibition Buildings on the Champ de Mars, will deserve separate visits. In Germany, the new Reichstagshaus, or Parliament House, at Berlin, the Imperial Palace at Strasburg, the Booksellers' Club at Leipsic, the Central Railway Station at Frankfort, the Hofburg-Theatre, and the new University Buildings, at Vienna, are perhaps the most important structures, although Germany is very prosperous just now, and new buildings are going up in all directions. In Italy, professional tourists will wish to see the new façade of the Cathedral of Florence, and the "Mole Antonelliana" at Turin, besides the modern part of Rome, and the extensive improvements in Venice and Naples.

AMONG the most interesting papers that come to us are those containing the observations of the workingmen who visited the recent Exposition in Paris, on the methods of construction and the ways of living among the workmen in different parts of Europe. A bricklayer and mason, Mr. William Delaney, sends to the Philadelphia *Press* a particularly good account of masons and masonwork abroad. That he is an excellent observer is shown by his remark upon Fountains Abbey and other "historical buildings of England and the Continent." Although he does not pretend to know anything more about the style in which these structures are designed than that it is "old," but "is still copied in modern buildings," he is struck at once with the fact that in all the real Gothic and Romanesque buildings "each piece of stone is of a convenient size to handle by hand." Architects will remember that in Amiens Cathedral, for example, there is not a stone so large that a man could not carry it up a ladder, and will appreciate the quickness and precision of Mr. Delaney's observation. So far as modern work goes, he thinks the "highest perfection of the building-trade" is attained in Paris, where "everything is artistic, from the beginning of the building to the last stroke of the painter's brush." "Every artisan and mechanic in Paris," he tells us, "is an artist," and "works with an eye to what would be beautiful and artistic in his industry." He is "not in a hurry to get the work off his hands," but "tries to make it look good, and generally succeeds." This remark, true as it is, shows an appreciation of artistic workmanship which we hope is widespread among American mechanics. Mr. Delaney attributes the superior taste of his French brethren to the "museums, art-galleries and gardens" which are free to all comers, and of which the French workmen avail themselves; and we hope that the time is not far off when our own mechanics will have the same advantages. Many persons will be surprised to hear that "the bricklayers in England do not seem to be well organized," and that on the Continent there is "no trace of organization" anywhere except in Paris. Many of the English bricklayers, it seems, "object to organization," and "claim that they can do as well outside of a union"; but the result is, Mr. Delaney thinks, that "they are not quite so independent in manner and appearance as the American workman of the same class." It is conceivable that the American workman might get through life just as prosperously, and a good deal more comfortably, if he were a little less "independent" in manner, but it is not necessary to discuss that matter here. As to the way in which the foreign workmen live, Mr. Delaney thinks that their "homes are less comfortable," their children are "not so bright-looking," and their houses are furnished less cheerfully, than is the case in America. Payment in England is by the hour, but masons usually work ten hours a day, with a half-holiday Saturday, making fifty-four hours per week. In France, Saturday is also a half-holiday, but the regular day is eleven or twelve hours, and in Holland and Germany the hours are even longer; but the French work less steadily than the English, and the Dutch are very slow, accomplishing little in a day. An English bricklayer will lay, in rough work, a thousand bricks a day, on an average, in a good and solid manner. In France, Germany, Belgium and Holland the average is much less. The wages paid in England to bricklayers vary from fifteen to sixteen cents an hour, the London men getting the most. In Paris, the wages are about the same as in London, although the work accomplished is less. In Germany and Holland, bricklayers earn only about a dollar a day. These are Mr. Delaney's figures, and, we imagine, are open to some correction, as are certainly those which he gives as to the cost of bricks in England.

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RELIGIOUS ARCHITECTURE.[1] — I.

AMONG primitive races, religion is the repository of beliefs and of knowledge indiscriminately. Every phenomenon, since it is uncomprehended and an object of superstitious dread, is referred to supernatural causes. The caste intrusted with the intermediary office between gods and men becomes at once the most powerful, because it is the most cultivated; it is this caste that maintains traditions and adds to the heritage of human knowledge. Religion, therefore, embraces at the same time the entire philosophy, ethics and science of a nation. And so it has a preponderant influence in the realm of politics, as well as in the moral and intellectual spheres.

In what art does religion seek and find its highest expression? From earliest times architecture has been preëminently destined to this mission, for it is, above all other arts, the work of man. Painting and sculpture have models on every hand; they borrow from around them the images of nature. Man, undoubtedly, brings his own conceptions of beauty, of purity of forms, of combinations of lines, of masses and of color to all the arts — conceptions which seemingly have no existence outside of himself, but are simple creations of his intelligence. Yet the painter and sculptor find already portrayed in nature itself the aspects of things which satisfy the innate need of harmony and purity; it is their office to reproduce these aspects, to express them after having selected them, to interpret, to eliminate, to bring out in relief the chief features, and sometimes to introduce order, precision and system into a confused or ill-arranged whole.

The architect's art is of an entirely different character; here, with no model, everything, *ensemble* and details alike, is drawn from the artist's own conceptions. In certain respects, architecture bears a strong analogy to music: it neither borrows nor imitates; it creates for itself fitting forms of expression — chords, harmonies and melodies endowed with power to furnish us keen intellectual enjoyment.

Why? And whence comes this power? We hardly know; at most, we can go but little farther than to surmise that the essential elements of these secret harmonies are founded, above all, on order and fitness. Traditional customs, mental bias, fluctuating tendencies, all combine with a fixed and permanent standard of arrangement to form what is called taste, in a measure almost impossible to discern, and which renders criticism difficult, delicate and transient.

In the early stages of its secular existence, every race has found the most complete expression of its faith, or of its cult, in its architecture, as the first glimmerings of knowledge have always been applied to this art. By way of recompense, each nation's architecture was destined to preserve the indelible impress of the soul that created it.

In favored, temperate climes, where life is not hard, when man has learned the secret of existence under institutions that have not proved too crushing for his growth, the well-balanced race develops easily and naturally. It finds its joy in the bosom of the present world, without looking beyond for compensations of which it feels no need; its spirit takes on a hue of naturalism or realism. This term is not to be understood in the modern, vulgar acceptation, which is a veritable misconstruction; we do not mean by our use of it that the artist seeks inspiration everywhere, and that he lovingly reproduces all sorts of ugliness, but, on the contrary, that he devotes himself to the task of detaching from the real such of its aspects as are indeed beautiful and worthy of being brought out in relief.

The conditions noted above have been realized from early times along the shores of the Mediterranean, which witnessed the inception of the first and noblest civilizations. Here art, without making any effort, but simply following the natural course of things, attained plastic perfection from the very outset.

In heat-oppressed regions, under a torrid sun, man, enervated and irresolute, shuns vigorous action, taking refuge in meditation, which he carries to the height of ecstasy. Powerless, and subjected to all sorts of tyranny through lack of physical and moral energy, he soon falls a prey to institutions which enslave him: in the bosom of overflowing abundance human distress becomes intolerable. There arise those philosophical speculations which descend to depths wherein the human mind strays bewildered, and finally reaches the bottomless abyss of annihilation. In the infinite there unveiled to philosophy everything is confounded under forms of continually increasing vagueness, and all culminates in annihilation. At the same time, from a religious point-of-view, annihilation becomes the image of eternal repose, sole refuge from the ills which assail mankind — a repose which humanity can hope for only on condition of losing all separate personality, all that constitutes individuality proper.

The art which takes birth among such races never attains the sovereign beauty of that which has its origin in perfect balance; but it may offer other qualities in compensation: the consciousness of boundless infinity supplants the perception of measured and limited proportion. Our Occidental ideas may be disturbed by this, and at first approach we may, perhaps, be surprised rather than charmed. This beauty none the less exists, as the countless edifices of India prove.

In the cold climates of the North, under mysterious fogs, the struggle for existence is likewise hard; but it is more vigorously sustained by races that know how to conserve their moral and physical force. To these virile generations, tempered by their struggles, complete self-abandonment and annihilation could never figure as their only reward; they have too much elasticity for that. If this world is too devoid of pleasures to satisfy them, they seek and find their joys above and beyond; with all the tenacity of their strong souls and their steady faith, they cling to the consolations offered them by a religion constituted expressly for them. Hence came that Western transformation of the Christian religion, which, in danger at one moment of being lost in the subtleties, useless discussions and petty quarrels of Byzantinism, reappeared, rejuvenated and ere long triumphant, among the barbarous nations of the North.

Consolations, say we, hopes of rewards beyond this life, for that is all that religion could offer to a society still plunged in disorder and distress, like that of the Middle Ages, and it was in this that its power and grandeur lay. But how far away was this conception from the ancient religion whose only mission was to express the joy of living and to represent, under eternally beautiful symbols, the beauty of the present world.

Thus we find outlined three great divisions of religious architecture; thus have appeared three different arts having, as it were, no common point of contact; three almost hostile arts, because they originate in opposing even contradictory conceptions concerning the present existence and the last end, and because the manner of facing what may await him in life or death constitutes the very foundation of man.

Such is the picture presented to our eyes when we contemplate, as a whole, the earliest endeavors of the different races; and it is clear why the history of religious architecture forms one of the most extended chapters in the general history of architecture. How many peoples have left, as the only traces of their passage, the religious edifices reared by them!

But one should not stop at this first glance. In a measure, as social institutions develop or change, religion itself changes; its mission and rôle are modified, and at the same time transformations take place in architecture, which is their expression. As political centralization, which is necessary to national life, is effected, religion descends from its purely moral heights, and the Church, becoming less religious, if we may so express it, then forms, according to the sanctioned term, one of the great bodies of the State. It is converted into an active potency, one of the elemental forces of the central power.

This metamorphosis is already noticeable among the Egyptians and Greeks, and it is still more marked when we reach the Romans. With this last people, worship becomes almost a civil function, an official power; temples are henceforth nothing more than public monuments, indicative, not of the pagan faith, but of Roman might, which seeks expression in grandeur and pomp.

Later on, when the new religion of Christianity took root amid the still imposing ruins of the Empire, architecture found difficulty in freeing itself from the Roman traditions, which persisted along with the remnants of the powerful Roman organization. Byzantine art, a decadent form of ancient art, disappeared only with the last vestiges of this organization.

[1] From the French of P. Planat, in Planat's "*Encyclopédie de l'Architecture et de la Construction.*"

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Then Christianity was born anew among vigorous young nations, which created for it a new and profoundly original form of expression.

Centuries elapsed. Then the same phenomenon which we have already indicated was manifested once more. Barbarian invasions had left vast accumulations everywhere, which were slowly incorporated into the primitive soil. Peoples and civilizations sprung out of these remains; a new organization began. Then, when agglomerations had been effected, centralization was again rudely outlined. When the Renaissance came the nature of faith had changed; by the side of royalty, religion played a political rôle which was daily growing in importance. Religious architecture once more lost its real character; in truth, it was merely a secondary branch of the civil architecture of the day; it retained hardly any of its essentially fitting forms, and these were simply traditional. It became, for a second time, pompous and official.

Civil and public architecture, which had long been relegated to a subordinate rank, then assumed an importance which soon grew to be preponderant. If we are obliged to go to religious structures to learn the characteristic features of Egyptian, Indian, Greek and Gothic styles of architecture, such is not the case with the Renaissance and later types: it is in palaces or châteaux, in great royal or seigneurial edifices, or in monuments raised by wealthy and powerful cities, that we must study the art of the sixteenth century and of the centuries following.

Before beginning here a rapid review of the religious architecture of successive peoples since remotest antiquity, we must ask ourselves what features we shall attempt to describe most clearly, as being the most characteristic; in this necessarily long enumeration we will try to find a conducting thread.

If it were possible to detect a certain form or disposition existing in all edifices belonging to one of the great epochs of architecture — to a style, as it is termed — and nowhere else, our task would be an easy one. It would then suffice to say: Every structure in which this form, or this disposition, occurs is necessarily of such a period, and pertains to such a people. The principle once set forth, the reader could be left to make his own applications of it. But, unfortunately, this is not the case.

Some of the older archæologists start out with the following statement: The beam or lintel is a special characteristic of Egyptian and Greek architecture, the semicircular arch of the Roman style, the cupola of the Byzantine and the pointed arch of the Gothic. They consider these to be sufficiently rigorous characterizations of the different styles. It would seem even that such a pronounced preference existed among these various peoples for one of these lines that the Egyptians would have suffered greatly if they had been compelled to employ a semicircular arch; that the Romans would doubtless have been very unhappy if necessity had forced the straight line upon them instead of the semicircle.

This simple classification, however, is far from being a rigid one; for the Assyrians, Phœnicians, Persians, Hindoos, Arabs and many other nations, whose civilization and architecture were profoundly original, archæologists have not yet pronounced on the line exclusively adopted by them! The beam or lintel was used in Egypt as in Greece and India; and yet, what relationship existed between the three styles of architecture? In addition to the fact that semicircular, depressed and pointed arches occur in Egyptian architecture, and even in Assyrian, the pointed arch is sometimes Roman; the semicircular arch is continually employed in the Gothic style, in very important parts of structures, and the pointed arch is, in truth, as much Romanesque as Arabic or Gothic.

Doubtless the frequent recurrence of a certain line is an important feature, and one not to be neglected, especially because it is easily apprehended. But, in view of the number of exceptions encountered in all directions, it has long been deemed insufficient to determine the style of architecture.

Later archæologists fell back upon other considerations; for them the characteristic of a style is the solution given by a people to some especially important problem of construction; they say, for example, that, when the question arose of roofing the vast halls of worship, which could not as formerly be covered with timber-work, since the edifices were thus most dangerously exposed to destruction by fire, the cupola on pendentives was adopted in Byzantine architecture, while later on Gothic architects invented groined vaulting on diagonal arches, with flying buttresses. We must recognize the importance, very characteristic, in fact, of these solutions, from which widely different dispositions and external forms have resulted; but here again, one must not be too confident. Some dome-covered structures are much nearer Gothic than Byzantine art in plan, and in external or interior appearance; many a church in the Lombard style has groined vaulting over the nave and also over the aisles, which would never be confounded with a genuinely Gothic church. The cupola and groined vaulting which are encountered in still many other styles, furnish, then, no infallible rules.

We should, therefore, not place too much stress on these two standards of distinction. In seeking means of classification, more attention should be given to general forms and to details of ornamentation. It is in these, perhaps, that the spirit, taste and originality of a people are most strikingly manifested. Notwithstanding the use of the pointed arch, an edifice will, nevertheless, often be recognized as Romanesque, not only in the proportions of its plan, but also and especially, in its squat appearance and in the peculiar forms of ornamental details; doubt will scarcely be possible after an examination of these features. Even though the ogival forms employed in a Persian or Arab structure should differ but little from the Gothic, no one would fail for a moment to recognize the ornamentation peculiar to these Oriental peoples, and which in no way resembles Occidental embellishments.

In our opinion, writers have not always insisted sufficiently upon the certainty assured by this architectural decoration, a term under which we include not only the details of ornamentation, but the system of proportions adopted for the principal lines; and it seems to us that Arab, Indian, Gothic or Egyptian architects were never tempted to treat a capital, a frieze, a cornice, a portal, nor even a simple base of a column in the same manner.

Without desiring to deduce from these last characteristics, however significant they may appear to us, any more absolute rules than the preceding, we will then say: It is the *ensemble* of the characteristics noted above which must be examined, in order to form an accurate idea of each style.

The scope of our sketch does not permit us to go into all the most delicate and complex details of this multifold study, but we will, at least, try to indicate its most comprehensive features.

With every nation, nature and its peculiar religious needs and traditional customs decided the general form of the houses of worship. Technical problems came up in connection with the chief dispositions of the plan thus fixed, which each people has solved in its own way, in accordance with the nature of the materials at its disposal, and with the degree of progress attained by it in knowledge and technical processes. In this way the principal lines are determined, not only for the plan and elevation, but for the decorative system. Then comes in the ornamental element; this differs as widely as possible in different races, for therein are chiefly expressed a nation's inventive genius, its fancy and even caprice, its taste for simplicity or for richness and complexity, its artistic sense of a more or less harmonious, more or less picturesque arrangement, and even that deftness of hand which varies so greatly according to the particular stage of its civilization.

Ornamentation is all the more pliant and fruitful because of the diversity of sources from which its elements are drawn. Geometry furnishes the sculptor with regular and masterly combinations of lines. In the vegetable world he continually gathers inspiration, and from the varying forms of the flora of different regions he borrows, ready-made, models, which he conventionalizes to suit his instinctive tastes. The animal world frequently supplies him with motives, more or less realistic or fantastic, according to the modifications which he introduces by association with geometric or vegetable forms. Lastly and especially, we may notice, among these sources, the human figure, which though totally absent in Arabian and Persian architecture, provided the Greeks with exquisite models of balancing in the *ensemble* and of perfection in the details; which held an important place in Gothic art, under somewhat awkward though charmingly naïve types; and which superabounded in Indian art.

According to the proportion in which these divers elements interpose, according to the spirit in which they are treated, as well as according to the degree of plastic perfection displayed by a people in utilizing them, results of surprising diversity are obtained, which seem to us, as we have said, especially fitted to distinguish the different styles of architecture that we are about to study.

We will now pass in review the great epochs of religious

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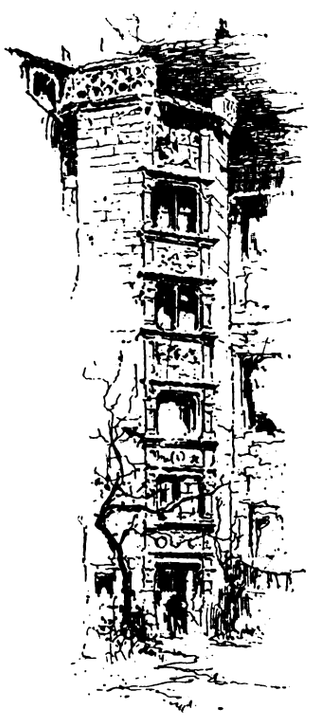
architecture, showing what ties link each school to its predecessors, and what original matter each has contributed to the history of the art.

[To be continued.]

THE BUREAU OF ETHNOLOGY'S FIFTH ANNUAL REPORT.[1] — II.



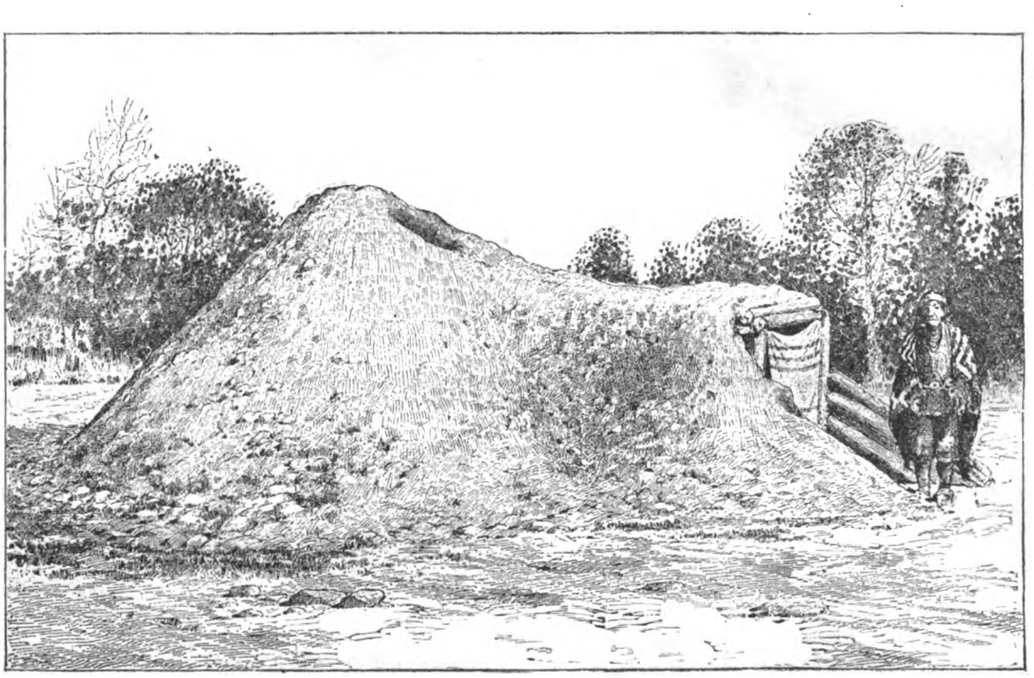
MR. CHARLES C. ROYCE contributes from the "*Historical Atlas of Indian Affairs*," upon which he has been engaged for several years, an account of "The Cherokee Nation of Indians." In his introduction he explains the plan and scope of the work, the chief aim of which is to show upon a series of State and Territorial maps the boundaries of the various tracts of country which have from time to time been acquired through the medium of treaty stipulation or act of Congress from the several Indian tribes resident within the present territory of the United States from the beginning of the Federal period to the present day. Accompanying the atlas will be one or two volumes of historical text, wherein will be given with some detail a history of the official relations between the United States and these tribes, treating of the various negotiations, the causes rendering such negotiations necessary, the methods observed by the Government in this diplomacy, etc.

This monograph on the history of the Cherokees with its accompanying maps, is given as an illustration of the character of the work in its treatment of each of the Indian tribes. The maps show the present as well as the ancestral home of the Cherokees, and also the various changes made by the different treaties in the boundaries of their tracts.

The Cherokees are appropriately selected for illustration of the method of Mr. Royce's important work, since they appear more prominently and for a longer period in the dealings of the United States with the Indians than any other tribe or nation. They have, indeed, played a prominent part in the tragedy of our "Century of Dishonor." As Major Powell comments: "For two hundred years, in wars, in councils and in courts, they have been engaged in struggles involving their existence, and they are one of the few Indian peoples that have passed through such ordeals into present prosperity. Their history shows that when the improperly directed power of the white race did not absolutely prohibit their advance in civilization some such advance was always attained, and it was always resumed after interruption when possible. During thirty years after the treaty of 1791 they made such manifest strides towards civilization, both in herding and in husbandry, that at the end of that time their agent reported Government assistance to be no longer necessary or desirable, the people being perfectly competent to take care of themselves, and in 1827 they established a Government, Republican in form and satisfactory in its operation until paralyzed in 1830 by the hostile action of Georgia. Their forced removal in 1838 to the west of the Mississippi for a time diminished their numbers, impaired their confidence and menaced their prosperity; yet five years later their energy and determination had exhibited renewed improvements, which continued until the war of the rebellion brought to them more desolation than to any other community. They were raided and sacked alternately by the forces of the United States and by those of the Confederacy, and were divided among themselves into fighting factions. Their country became a waste, and in the few years of the war their numbers were reduced by at least one-third; yet to-day they are more prosperous than ever before, and have probably a greater population than at any time since they have been known in history."

A people must, indeed, contain splendid vitality to bear such a record as the Cherokees. The history of Mexico, which to-day is fundamentally an Indian Republic, reinforced by the example of the Cherokees and the other civilized tribes in the Indian Territory, demonstrate the inherent capacity of the Indian for advancement in culture; the fact that he has not progressed farther is not so much to be wondered at as that he has progressed at all in face of the brutal efforts of our own race to check and thwart every tendency towards improvement. Neither, in the light of the increase of the Cherokees, does the frequent prediction of the ultimate extinction of the Indians bid fair to be realized. It looks more like ultimate absorption in the great volume of our race. In this connection some far-seeing words by Walt Whitman, from a letter written to the Committee on the Tercio-millennial Celebration at Santa Fe in 1883, are appropriate: "Then another point, relating to American ethnology, past and to come, I will here touch upon at a venture. As to our aboriginal or Indian population — the Aztec in the South and many a tribe in the North and West — I know it seems to be agreed that they must gradually dwindle as time rolls on, and in a few generations more leave only a reminiscence, a blank. But I am not at all clear about that. As America, from its many far sources and current supplies, develops, adapts, entwines, faithfully identifies its own — are we to see it cheerfully accepting and using all the contributions of foreign lands from the whole outside globe — and then rejecting the only ones distinctively its own — the autochthonic ones?"

The value of the paper is enhanced by the many biographical notices, details of life in the early years of our country before and after the close of the Colonial period, and the sufferings borne by the Cherokees during their many persecutions by their covetous neighbors. Major Powell well says that the care and skill devoted by Mr. Royce to make the statement both accurate and comprehensive, fortifying it also by the citation of their best authorities, will render it valuable to statesmen, historians and lawyers.



Navajo Medicine-lodge.

Mr. Royce, however, is more of a compiler than historian, and has committed one astonishing and unpardonable error of omission. With all the interesting accounts of the advancement of the Cherokees in civilization, the great feature which makes that people unique in the world's history has the barest and most identical mention. That is the fact that the Cherokees are the only people who have suddenly sprung of their own volition from illiteracy to the rank of a lettered folk, with an alphabet and orthography devised by one of their own number on wholly original ideas, and particularly adapted to their needs. The only allusion to this fact, which is the greatest thing in the whole history of the Cherokees and one of the most important circumstances in the record of

[1] Continued from No. 741, page 153. Charles C. Royce's "*Historical Atlas of Indian Affairs*": — *the Cherokees*; Dr. Washington Matthews on the Navajos.

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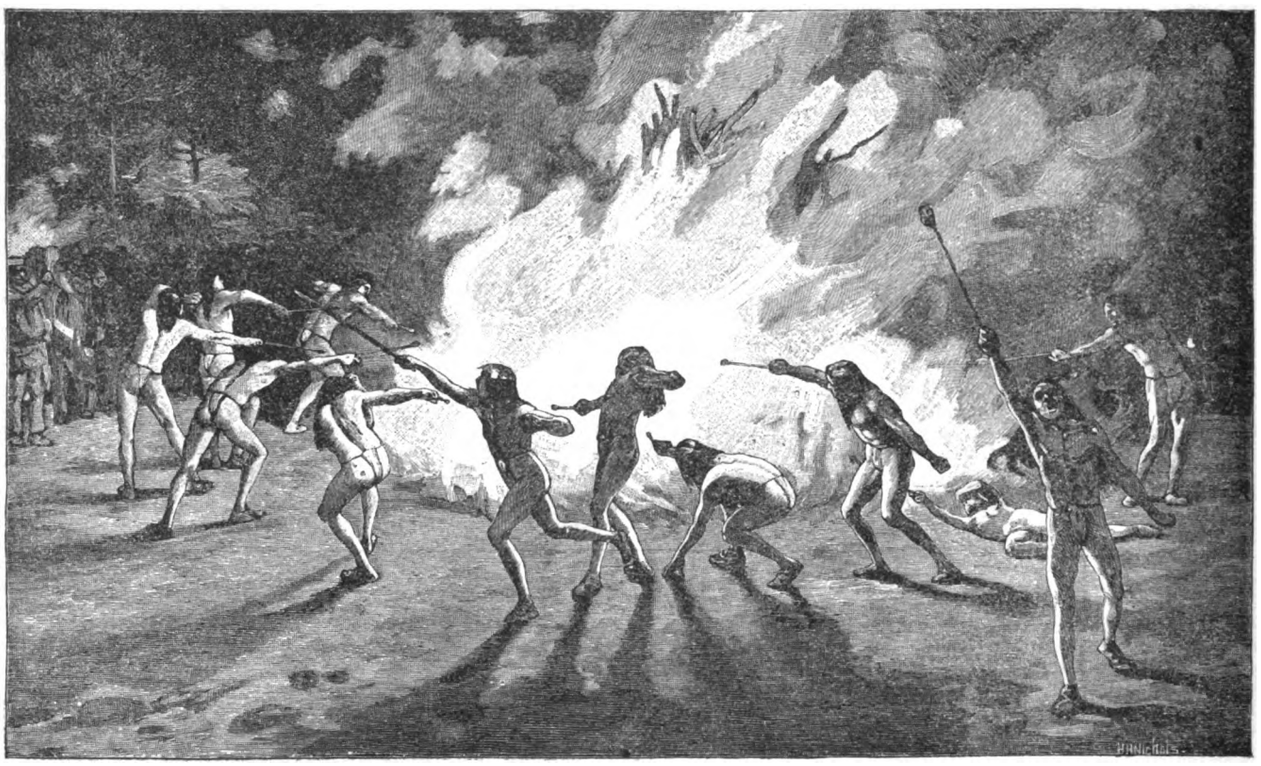
primitive races, and which in itself is enough to give the Cherokees immortality so long as the science of ethnology shall last, is contained in a few lines about the death of Sequoyah — who has a fitting monument in the name given the giant-trees of California — the Indian Cadmus whose great inventive mind wrought this work for his people. It is to be hoped that the fascinating history of the Cherokee alphabet will some day be written in the true scientific spirit that such an event merits.

Mr. Royce concludes with some interesting general remarks, from which we learn that the Cherokees, after their long periods of adversity, are to-day more numerous and prosperous than they have been since they were removed west of the Mississippi.

Dr. Washington Matthews, Assistant Surgeon, U. S. A., has an exceedingly interesting and scholarly contribution called "The Mountain Chant: a Navajo Ceremony." Dr. Matthews became interested in the Navajos while stationed at Fort Wingate in New Mexico, and devoted all his leisure to studying them. Dr. Matthews had already accomplished much ethnological work of a high order while stationed in other sections, and the Navajos, that numerous and interesting division of the great Apache, or Tinneh, family, presented an excellent opportunity for study, their reservation being not far from Fort Wingate to the northward. While at Fort Wingate Dr. Matthews became acquainted with Mr. Franklin Hamilton Cushing, Zuñi being something like forty miles to the southward; he perceived the rare genius of the youthful ethnologist immediately — the bearing of Mr. Cushing's studies was sadly misunderstood by most of the Americans in the country at that time — and a firm and lasting friendship sprang up between them, which has resulted in much invaluable mutual service in their respective lines of investigation.



A Navajo Dance.

The ceremony which forms the subject of Dr. Matthews's paper is one of a large number practised by the *shamans*, or medicine-men, of the Navajos, and was selected by the author because he had witnessed it the most frequently, because it was the most interesting to the Caucasian spectator, and because it is the best known to the whites who visit and reside around the Navajo country. "Its chief interest to the stranger lies in the various public performances of the last night. Like other great rites of the *shamans*, it has its secret ceremonies of many days' duration in the medicine lodge; but unlike the others, it ends with a varied show in the open air, which all are invited to witness. Another ceremony which I have attended, and which the whites usually call the 'Yaybichy Dance' [Yebitçai], has a final public exhibition which occupies the whole night, but it is unvaried. Few Europeans can be found who have remained awake later than midnight to watch it. Such is not the case with the rite now to be described. Here the white man is rarely the first to leave at dawn."

From this introduction, the extremely interesting character of the performance may be inferred. Indeed, it is one of the most fascinating accounts of Indian customs written since Capt. J. G. Bourke's book on the Rattlesnake Dance of the Moquis. The Indian of this ceremony is "Dsilyidje qacal," and is said to have originated with the great prophet of the Navajos, who, like most other peoples, also appear to have had their great traditional teacher. The myth of Dsilyic Neyani (Reared within the Mountains), this great teacher, shows his captivity among the Utes, his escape by the intervention of gods, and his travels, sufferings and adventures in regaining home, all of which, under divine guidance, were in the nature of an initiation into all religious rites, with the injunction that these should be communicated by him to his people. Shortly after his return, having performed his duty as teacher or prophet, he disappeared to rejoin the gods in accordance with their promise made to him during his initiatory travels. Major Powell, in his editorial comments, pronounces this presentation by Dr. Matthews, "given in the genuine Indian style and conception, without admixture of European interpretation and civilized gloss" one of the most important contributions to the history of Indian myths, and he finds in it essential similarities to the myths of the Egyptians, the Hindoos and the Greeks, and other peoples, furnishing instructive evidence of similarity in the stage of mythologic philosophy coming from a before unexplored source and only modified by the readily understood differences of environment.

Dr. Matthews writes that "the purposes of the ceremony are various. Its ostensible reason for existence is to cure disease; but it is made the occasion for invoking the unseen powers in behalf of the people at large for various purposes, particularly for good crops and abundant rains. It would appear that it is also designed to perpetuate their religious symbolism. Some of the shows of the last night are undoubtedly intended to be dramatic and entertaining, as well as religious, while the merely social element of the whole affair is obvious. It is an occasion when the people gather to have a jolly time. The patient pays the expenses, and, probably in addition to the favor and help of the gods and the praise of the priesthood, he hopes to obtain social distinction for his liberality."

As very similar motives govern the course of many of our so-called "devout," can they be said fundamentally to occupy any different grade from that of the savages?

Dr. Matthews's account of the ceremonials is full of the most interesting incidents. Following is a description of the medicine-lodge in which the ceremonies took place at the time when he had the most complete view of them during a visit made to a place on the Navajo reservation about twenty miles from Fort Wingate, called Niqotlizi [hard Earth]. It was a simple conical structure of large, partly hewn piñon logs, set on end and inclined at an angle of about forty-five degrees, so as to join on top where they formed the apex of the lodge. The circle of logs was incomplete in the east, where the openings for the door and the smoke-hole were. A passage, or entry, about five feet high and three feet wide, led from the body of the lodge to the outer doorway, where some blankets hung as portiéres. The frame of logs was covered with sods and loose earth to keep out the wind and rain. Internally, the lodge was eight feet in height under the apex of the cone, and on an average twenty-five

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feet in diameter at the base. The diameter was increased at the east to allow for the entry, and at the north. The irregularity in the circumference in the north was at first conjectured to be a mere accident; but in the ceremonies of the first night its use became apparent as affording a hiding-place for one of the characters in the ceremonial — the man dressed in evergreens.

Dr. Matthews was accorded the rare privilege of witnessing the ceremonials that took place within this lodge, one of the most interesting of which was the making of the elaborate "sand-painting" appropriate to the order of the day: "About noon they cleared off that portion of the floor of the lodge which lay west of the fire, and brought, in blankets, a quantity of dry sand, which they spread out over the cleared portion of the floor in a layer of the nearly constant depth of three inches. They smoothed the surface with the broad oaken battens used in weaving. Now for a time all operations were suspended in the lodge while the chanter went out to plant the *çobolçà*, or plumed wands, in front of the medicine lodge, and to lay beside them the collars of beaver skins and the symbols for wings which the couriers were to wear next day. These articles, it was said, were placed outside as a sign to the gods that the holy pictures were being drawn, but it is not improbable that they were intended also as a sign to uninitiated mortals. However that may be, they were taken in as soon as the picture was finished. The great painting was begun about one o'clock P. M., was finished about three, and was allowed to remain until the ceremonies at night were concluded.

"The pictures are drawn according to an exact system. The *shaman* is frequently seen correcting the workmen, and making them erase and revise their work. In certain well-defined instances the artist is allowed to indulge his individual fancy. This is the case with the gaudy embroidered pouches which the gods carry at the waist. Within reasonable bounds, the artist may give his god just as handsome a pouch as he wishes. Some parts of the figures, on the other hand, are measured by palms and spans, and not a line of the sacred design can be varied. Straight and parallel lines are drawn by aid of a tightened cord. The mode of supplying the colored powder is peculiar. The artist has his bark trays laid on the sand, where they are convenient of access. He takes a small quantity of the powder in his closed palm, and allows it to pass out between his thumb and forefinger, while the former is moved across the latter. When he makes a mistake he does not brush away the pigment. He obliterates it by pouring sand on it, and then draws the corrected design on the new surface. The forms of the gods do not appear as I represented them, in the first coat of color. The naked figures of these mythical beings are first completely and accurately drawn, and then the clothing is put on. Even in the pictures of the 'Long Bodies,' which are drawn nine feet in length, the naked body is first made in its appropriate color — white for the east, blue for the south, yellow for the west and black for the north — and then the four red shirts are painted on from thigh to axilla, as shown in the picture. The drawings are, as a rule, begun as much towards the centre as the nature of the figure will permit, due regard being paid to the order of precedence of the points of the compass, the figure in the east being begun first, that in the south next, that in the west third in order, and that in the north fourth. The periphery is finished last of all. The reason for thus working from within outwards is that the men employed on the picture disturb the smooth surface of the sand with their feet. If they proceed in the order described, they can smooth the sand as they advance, and need not cross the finished portions of the picture."

There are seventeen great healing dances in which pictures of this kind are drawn, and four pictures, with few exceptions, appropriate to each dance. "Some of the dances are practised somewhat differently by different schools or orders among the medicine-men, and in these divers forms the pictures, although agreeing in general design, vary somewhat in detail. Thus there are, on an average, probably more than four designs, belonging to each of the seventeen ceremonies, whose names I have obtained. If there were but four to each, this would give us sixty-eight such paintings known to the medicine-men of the tribe, and thus we may form some conception of the great number of these sacred pictures which they possess. But I have reason to believe, from many things I have heard, that besides these seventeen great nine days' ceremonies to which I refer, there are many minor ceremonies, with their appropriate pictures, so that the number is probably greater than that which I give.

Navajo Fire-dance.

"These pictures, the medicine-men aver, are transmitted from teacher to pupil in each order and for each ceremony unaltered from year to year, and from generation to generation. That such is strictly the case I cannot believe. There are no standard pictures on hand anywhere. No permanent design for reference is ever in existence, and there is, so far as I can learn, no final authority in the tribe to settle any disputes that may arise. Few of these great ceremonies can be performed in the summer months. Most of the figures are, therefore, carried over from winter to winter in the memories of fallible men. But this much I do credit, that any innovations which may creep into their work are unintentional, and that, if changes occur, they are wrought very slowly. The *shamans* and their faithful followers believe, or profess to believe, that the direst vengeance of the gods would visit them if these rites were varied in the least in picture, prayer, song or ceremonial. The mere fact that there are different schools among the medicine-men may be regarded as an evidence that changes have occurred."

These pictures were made daily during the season of solemnity, and obliterated with elaborate ceremonials. On the eighth day, the building of the great stack of wood which was to furnish the fire in the centre of the corral on the last night proceeded simultaneously with the making of the picture, forming a pile of seasoned juniper and cedar, of the most inflammable character, about twelve feet high and sixty paces around, while large quantities of wood were made

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ready to replenish the fire. The ninth day was occupied until sunset in preparing certain properties to be used in the ceremonies of the night. These were ingenious devices for the deception of the public in the apparent swallowing of arrows and saplings, and other tricks of magic. "As each set of implements was completed there was a ceremony with singing and rattling, the men who were to use them at night partook of powdered medicine on their extended tongues from the hands of the chanter, and then practised themselves in the use of the implements. Although they well knew the deceptive nature of these articles, and fully understood the frauds they were preparing to perpetrate on the public, these young men seemed to view the whole work with high reverence, and treat it with the greatest seriousness. For instance, when in the secrecy of the lodge they went through the motions of swallowing the trees, they showed indubitable signs of fear: all looked anxious, some trembled quite perceptibly, and one looked as pale as a live Indian can look. They probably dreaded the displeasure of the gods if all were not done well."

The performances of the night were extremely theatrical, and would make a first-class attraction on any stage. A dark circle of branches was built around the fire about eight feet high, forming an enclosure of sacred ground about forty feet in diameter. At eight o'clock a band of musicians forming a sort of orchestra entered and performed with hardly any interruption until morning. At the moment the music began the great fire was kindled, and in a few moments the entire pile was in flames. "A storm of sparks flew upward to the height of a hundred feet or more, and the descending ashes fell in the corral like a light shower of snow. The heat was soon so intense that in the remotest part of the enclosure it was necessary for one to screen his face when he looked towards the fire. And now all was ready to test the endurance of the dancers, who must expose, or seem to expose, their naked breasts to the torrid glow.

"When the fire gave out its most intense heat, a warning whistle was heard in the outer darkness, and a dozen forms, lithe and lean, dressed only in the narrow white breech-cloth and moccasins, and daubed with white earth, until they seemed a group of living marbles, came bounding through the entrance, yelping like wolves, and slowly moving around the fire. As they advanced in single file, they threw their bodies into divers attitudes — some graceful, some strained and difficult, and some menacing. Now they faced the east, now the south, the west, the north, bearing aloft their slender wands tipped with eagle-down, holding and waving them with surprising effects."

Many of these dances took place in succession, each of a different character, full of incident and theatrical display. We cannot forbear quoting in full the account of the eleventh of these, the fire-dance, or fire-play, the most picturesque and startling of all: "Some time before the actors entered, we heard, mingled with the blowing of the buffalo-horn, strange sounds, much like the call of the sand-hill crane; they will, for convenience, be called trumpeting. These sounds continued to grow louder and come nearer, until they were heard at the opening in the east, and in a second after, ten men, having no more clothing on than the performers in the first dance, entered. Every man except the leader bore a long, thick bundle of shredded cedar-bark in each hand, and one had two extra bundles on his shoulders for the later use of the leader. The latter carried four small fagots of the same material in his hands. Four times they all danced around the fire, waving their bundles of bark towards it. They halted in the east; the leader advanced towards the central fire, lighting one of the fagots, and, trumpeting loudly, threw it to the east over the fence of the corral. He performed a similar act at the south, at the west and at the north; but before the northern brand was thrown he lighted with it the bark bundles of his comrades. As each brand disappeared over the fence, some of the spectators blew into their hands and made a motion as if tossing some substance after the departing flame. When the fascicles were all lighted, the whole band began a wild race around the fire. At first they kept close together, and spat upon one another some substance of supposed medicinal virtue. Soon they scattered and ran, apparently without concert, the rapid racing causing the brands to throw out long, brilliant streamers of flame over the hands and arms of the dancers. Then they proceeded to apply the brands to their own nude bodies and to the bodies of their comrades in front of them, no man ever once turning around. At times the dancer struck his victim vigorous blows with his flaming wand; again, he seized the flame as if it were a sponge, and, keeping close to the one pursued, rubbed the back of the latter for several moments, as if he were bathing him. In the meantime the sufferer would, perhaps, catch up with some one in front of him, and in turn bathe him in flame. At times, when a dancer found no one in front of him, he proceeded to sponge his own back, and might keep this up while making two or three circuits around the fire, or until he caught up with some one else. At each application of the blaze the loud trumpeting was heard, and it often seemed as if a great flock of cranes was winging its way overhead southward through the darkness. If a brand became extinguished, it was lighted again in the central fire; but when it was so far consumed as to be no longer held conveniently in the hand, the dancer dropped it and rushed, trumpeting, out of the corral. Thus, one by one, they all departed. When they were gone many of the spectators came forward, picked up many of the fallen fragments of cedar-bark, lighted them, and bathed their hands in the flames as a charm against the evil effects of fire.

"Did these dancers next day hide sore and blistered backs under their zarapes? I think not, for I have seen and conversed with some of the performers immediately after the fire-show, and they seemed happy, and had nothing to complain of. Did the medicine they spat on one another save them? Certainly not, although the Indians claim it as a true prophylactic against burns, and call it *aze sakazi*, or cold medicine. But it is probable that the cedar-bark ignites at low temperature, and more than probable that the coating of white earth with which their bodies were covered is an excellent non-conductor. However, the thought that their bodies might have been thus ingeniously protected lessened a little, if any, the effect produced upon the spectator. I have seen many fire-scenes on the stage, many acts of fire-eating and fire-handling by civilized jugglers, and many fire-dances by other Indian tribes, but nothing quite comparable to this in all its scenic effects."

The close and accurate observation of the author, his gift of clear and vivid literary expression, and his thorough scientific knowledge give this paper rank among the most notable contributions to American ethnology. The superb illustrations are worthy of the text. The extraordinary sand-paintings described are reproduced from drawings by Dr. Matthews in handsome colored plates, and there are many beautifully drawn and engraved cuts. The two full-page pictures, representing, respectively, the "Dance of Nahikai" and "The Fire-dance," are particularly admirable in their presentation of the wild scenes, so full of action, with effects of intense fire-light.

Sylvester Baxter.

[To be continued.]

THE TUDOR EXHIBITION.[1] — II.

ARMOR, RELICS, ETC.

"All the Modern Improvements." — No. 5.

THE first objects that we see on entering this exhibition are the suits of armor and cases of weapons, all most carefully arranged, by far the largest exhibitors being the Baron de Cosson, who has also described them, Edwin Brett, Esq., and S. J. Whawell, Esq.

We are told in the Catalogue "that it is only within the last few years, and by three or four students at most, that any critical study of the work of the great master-armorers of the fifteenth and sixteenth centuries has been undertaken"; and doubtless we are indebted to these *connoisseurs* for many interesting facts connected with the manufacture and subsequent history of some of the more important specimens of the armorer's skill.

The chief armorers of the Tudor period were successively the families of Missaglia and Negroli, in Milan, whose work is largely represented here. After them ranked the Spanish and German manufacturers and the English. With regard, however, to the weapons called English, it is noticeable that the only part really deserving of the name, is the hilt, often most beautifully decorated with engravings of silver, representing figures, fruit, foliage, etc., the blade generally bearing the name and private mark of a foreign maker.

It is, of course, beyond the limits of a letter to describe minutely so large and splendid a collection. Still, apart from the first-rate workmanship of those old artists in iron and steel, great national and historic interest attaches to it, as we shall show.

There are twenty complete suits of armor; *cap-à-pie*, or three-quarter, four of which deserve special mention: First, that of the Earl of Pembroke, commander of the English forces, coöperating with those of Philip II at the siege and battle of St. Quentin, 1557, during a war which brought little glory to us but this victory, in gratitude for which Philip built the Escurial, and resulting, as far as the English were concerned, in the loss of Calais. The suit is *cap-à-pie*, in russet and gilt, burgonet and buffe, and shows in several

[1] Continued from No. 745, page 12.

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places the arms and garter of the Earl. The present Earl of Pembroke lends this suit with those of two of the most notable prisoners taken by his ancestor at that fierce combat.

The armor worn by Anne de Montmorency, Constable of France, who, though one of the most distinguished captains of the century, was thrice captured: first at Pavia, with Francis I, in 1525; next taken, badly wounded, at St. Quentin; and, thirdly, at Dreux in 1562. His is a three-quarter blue-and-gilt suit, with burgonet and buffe, splinted breast and back, and is of large size.

The third of this interesting group of magnificent suits is that of Louis de Bourbon, Duc de Montpensier, also taken prisoner at St. Quentin with many other French nobles. It is a full suit in russet and gilt, but reaching only to the ankles, the head-piece being a close helmet.

The last suit whose wearer's name is given is of more romantic interest, and belonged to George Clifford, Earl of Cumberland, whose mother was daughter of Mary Tudor and Charles Brandon, Duke of Suffolk. This suit, perhaps the finest one of russet and gilt extant, was probably worn by the Earl on taking over from Sir Henry Lee the office of Champion of Queen Elizabeth, in virtue of which office he presided at the jousts and tournaments held every Queen's Day, November 17, at Westminster, at the back of the present Horse Guards, then, as now, known as the Tilt Yard. A remarkably fine German suit, entirely fluted, of the fashion known as Maximilian armor, from Lord Stafford's armory, lent by the Baron de Cosson; in old English inventories it would have been called a "field" or "hosting (war) harness crested," to distinguish it from the harness especially made for tilt or tourney. The helmet opens down the chin, and is attached to the gorget by a rim. The breast-plate is remarkable for being made in two pieces, after the fashion of fifteenth-century armor, with some delicate open-work at upper edge of lower portion. The fluting is close and narrow, and the steel exceedingly hard; it is of the date of Henry VIII.

An incomplete fluted and crested suit, thought to be by Negroli, is remarkable for the richness, simplicity and taste of its decoration. This consists, where the ground is not covered with engraving and gilding, in alternate bands of bright steel and of engraving and gilding, separated by ridges in low relief, the armor being thus of the kind called fluted and crested. On the upper part of the breast is a broad band, on which are engraved and gilt the Virgin and Child, with an architectural background, having on either side St. Paul and St. George in glory. Below, in two lines, is the following inscription in large characters: "*Christvs. Res (sic) Venit. In. Pace. Et. Devs. Homo. Factus. Est.* The back-plate has "*Jesus. Avtem. Transiens. Per. Medivm. Illorvm. Ibat.*," and below a large triangular space covered with engraving and gilding, with flutings on either side. A similar space in front of the gorget has a gilt and engraved representation of the Trinity on a nimbus.

Among the other suits are a great variety of styles; viz., black and bright, embossed with designs of foliage, etc.; black with white stripes; and several engraved with the Crucifixion, one of the latter kind having, besides, the figures of four kneeling knights.

The tournament helm of Sir Giles Capel, one of the knights who, with Henry VIII, challenged all comers at the Field of the Cloth of Gold, 1520, hung over his tomb in Rayne Church, Essex, till 1840, when the church was pulled down. It was so large that he could turn about his head inside it, numerous apertures being pierced in the visor in several places to enable him to see in different directions; but these were so narrow that the point of the finest pointing sword could not injure him. This helm was firmly fixed to the breast-plate. The thickly-wadded hood, always worn inside, was fastened by rivets to the neck and elsewhere to prevent it flapping about.

One embossed casque of great artistic beauty and of Italian workmanship was picked up for £1 at a pawnbroker's at Hampstead. The figures represent a warrior (Mars?) with Victory and Fame holding his moustaches; the date is about 1540. This casque, and one in the Musée d'Artillerie, Paris, closely resembling it, are believed to be by Picinino from Negroli's design.

Of great strength and beauty is a German sallad, a head-piece used by all men-at-arms throughout Europe at the close of the fifteenth century; it was completed by the bevor, which was screwed firmly to the breast-plate, and the sallad was fixed to it. This sallad has had a singular history. At one time it formed part of the stage-property of the Opera-House, Madrid; it thence passed into the collection of Don Jose Vera, and afterwards into that of Fortuny, the painter. It has been identified in authentic drawings of Charles the Fifth's armory, where it is called "old stuff that came from Flanders." It is, therefore, thought probable that it belonged to Philip the Fair, and was sent to Spain when Charles I became King of that country, afterwards known as Charles V, Emperor of Germany.

English helmets were peculiar for the very prominent visor with a hollow curve, and having a little door on the right side, which, by pressing a spring, could be opened, thus enabling the wearer to breathe more freely after an encounter, or even speak, without removing his helmet.

Among about one hundred swords, rapiers and daggers, we find, naturally, great variety, both of size and style; for example, the heavy war-sword, used with gauntlets; the lighter town-sword or rapier, provided with knuckle-guard; the duelling rapier, much longer than others, one here having a blade of forty-eight inches; swords two-handed and two-edged; practising swords without points, and others, for soldiers, with the points strong and "very serviceable."

As with the suits of armor, so with the weapons; there is a profusion of fanciful designs and mottoes. One rapier has New Testament subjects, with mounted combatants chased on the hilt; the blade of another has "Hea, Hea, Hea, Hea," on each face; while "Inri," "Maria," "Soli Deo Gloria" and "Fides Sed Cui Vide," with a king's head in a gilt medallion, ornament others. The two-handed sword of Dudley, Earl of Leicester, has his badge of the Bear and Ragged Staff several times on the hilt; the quillons of chased-steel being fashioned like ragged staves, and terminating in bears with ragged staves.

The blade of a dagger is inscribed "God Guide The Hand. That I In Stand." One of two executioners' swords has a gallows and a wheel on the blade in copper. An iron hand-buckler or target, for use with a sword, bears rude representations of the rose, portcullis, *fleur-de-lis* and harp; in the centre is a boss, acting as a sword-breaker, and round the margin "Wisdom. Faith. And. Prowess. Svpport Kingdoms."

Several wheel-lock pistols and guns are exhibited, many having the stock beautifully inlaid with ivory, or even mother-of-pearl and ivory.

Leaving these mementos of a warlike age, we turn to the more romantic portion of the exhibition, and, making our way through knots of admiring onlookers, we pause at the cases: the gold cups, etc., and silver spoons, but find the gold to be only silver-gilt. Indeed, in the whole collection, less than a dozen are made of gold; viz., some watches and rings, which we leave for the present while we linger a short time over the cups, rose-water basins and salt-drums, all with covers. Interspersed with these are about two dozen silver spoons — "Apostle," "Maiden-head," "Christening" or seal-headed, none of which call for notice except four "Apostle" spoons, forming part of a set of thirteen, which, with some belonging to the Goldsmith's Company, are the only two sets of thirteen spoons now known.

The oldest piece of plate is dated 1490, and is a mazer or maple-wood cup, with silver-gilt rim, and monogram "*i h c*" on dark-blue enamel encircled with rays. The ivory "Grace Cup" of Thomas à Becket is exceedingly rich, with silver-gilt, precious stones and pearls. A silver-gilt rim and lining has been fixed to the ivory cup, the foot and cover being strengthened and beautified in the same way; the whole further ornamented by bands of rich chasing alternating with pearls and jewels. Sir Henry Howard, standard-bearer to Henry VIII, bequeathed this cup to Katharine of Aragon, who left it to the Howard family at her death.

A great point of attraction is a cocoanut cup given to Sir Francis Drake by Queen Elizabeth. The cup has a rim of silver-gilt delicately engraved with beasts, etc., and is divided by the straps connecting the rim with the stem into three panels, engraved, respectively, with the royal arms, those of Drake, with date, 1580, and with a picture of his ship and several prizes, all gilt. A boldly-modelled figure of a dragon with outstretched wings supports the cup, and the foot is richly ornamented. The cover is very beautiful, being composed of ships and sea-monsters in silver-gilt, surmounted by the vessel in which he circumnavigated the globe, most exquisitely wrought. Another magnificent cup given by Elizabeth to the great navigator is also silver-gilt, ornamented by rich filigree-work, the cover being surmounted by a figure of Hercules. These are lent by the present Sir Francis Drake.

A silver-gilt tankard, known as the "Poison Tankard," has the body of crystal encased in filigree; on the flat top surrounded by filigree work is a pyramidal crystal, which was supposed to become cloudly or milky, if poison was in the cup. The foot rests on three cherubs' heads. This is English work, circa 1570.

The silver-gilt rose-water basin, lent by the Corporation of Bristol, owes its present existence to a Mr. Williams, a Bristol silversmith. During the riots of 1831, a man named Ives stole the basin, and, cutting it up into 167 pieces, offered them for sale to Mr. Williams. He had Ives arrested, and he received fourteen years transportation. The silversmith, with infinite pains, fitted the pieces together and rivetted them to a silverplate now forming the back of the bowl. It is engraved all over its surface with characteristic arabesque work, with scallop-shells, flowers, etc., and in the middle has a raised coat-of-arms. The ewer is jug-shape, similarly ornamented, and has in front a cherub's head, in high relief.

There are some quaint watches, three of which belonged to Queen Elizabeth: two gold ones, one in the shape of a cross, and one in silver, melon-shaped, in a shagreen-case. Besides these, there are several metal-gilt watches, two having iron works and an open-work brass watch-case.

There are not many rings, but the romance entwined round one of them makes up for their paucity.

This is the famous ring given by Elizabeth to Essex. It is a gold sardonyx ring, the cameo representing a portrait of the Queen in high ruff; the inside is enamelled in blue and gold. It seems to have been originally made for a very small finger, and afterwards enlarged.

There are nine gold posy rings, *temp.* Henry VIII, Elizabeth, with the following mottoes: "*As you yous me you shale find me; Kepe faith till Death: Once myne and ever Thyne; God I pray your happiness inivy, etc.*"

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But it is impossible to classify everything in this *omnium gatherum* of relics, we can only name a few of the more interesting. The rosary of Henry; a small gold *etui*, about two inches long, given by Queen Anne Boleyn to the officer on guard at her execution. When presenting it, she told him "it was the first token the King had given her," bidding him observe "that a serpent formed part of the device, and a serpent the giver had proved to her." It is in the form of a pistol, the barrel serving the purpose of a whistle and enclosing a set of toothpicks; a serpent is coiled round the handle. A medallion in soapstone with bust profile of Maximilian I. In Germany, models for medals were made in soapstone; in Italy in wax, but in England usually in clay.

A "Book of Hours," belonging to Mary Tudor, Duchess of Suffolk, whose arms and badge are on the cover; it is supposed to have been used by Mary, Queen of Scots, on the scaffold. It is a little book about five inches long. The christening mantle of red velvet and silver tissue, worn by Henry VIII; a lace canopy, said to have been worked by Anne Boleyn and used at Princess Elizabeth's christening, and a piece of silver tissue, part of the canopy used at that of Edward VI. A purse, embroidered with the Tudor rose and the motto: "Money maketh mirth when it is plenty, but small is the mirth when the purse is empty."

The Phœnix badge of Queen Elizabeth in silver (A. D. 1558). Elizabeth, early in her reign, adopted the Phœnix as her device; it was the symbol of celibacy; and she told her first Parliament that she wished her monument to inform posterity "Here lies a Queen that lived and died a Virgin." One rosary has beads of coral and silver; in another they are made of carved horn, in which are set small portraits of saints, etc.; a reliquary with *églomisé* work is attached to it. There are many specimens of Queen Elizabeth's needlework for which she had abundant leisure in her earlier life, the more interesting being the set of baby-clothes she made for her sister Mary, but which were never required, and remained unused; and a pair of infant's lace gloves! made and presented by Elizabeth to the Burton family with her portrait, which is fixed on the wall at Lonquer Hall, when she heard that Edward Burton had died of joy at her accession; he having been bitterly tormented by Queen Mary. Sir John Burton, his father, was Groom of the Stole to Henry VIII.

There is a red hat with bright green feather, of Henry VIII, with a pair of embroidered slippers without heels, of Anne Boleyn, of which we give the story. Nicholas Bristowe, a favorite courtier of Henry's, was riding with him and the Queen, in Hertfordshire. Passing Ayot St. Lawrence he greatly admired the place, wondering whose it was. The King said "It is mine, but now shall be yours." Bristowe asking what evidence he was to produce of the gift, the King gave him the hat he was wearing and asked the Queen for her slippers, saying, "Bring me these in London, and I will give you the title deeds." The hat and slippers have since always gone with the estate. Near these is Cardinal Wolsey's hat, red felt, with a very wide brim; it looks rather weather-beaten.

We have here two small carvings of Henry VIII, by Holbein, one in hone-stone, considered to be one of the finest portraits of the King, it is full-length, and is in a curious carved frame; the other is in boxwood; Henry wears a watch round his neck. There is also a medallion in wax of this sovereign, lent by Her Majesty, with one of Sir Thomas More and Cardinal Wolsey; all three exceedingly clear and good.

Above a lock of sandy-colored hair is the following: "This Lock of Queen Elizabeth's own Hair was presented to Sir Philip Sidney by Her Majesty's own fair hands, on which he made these verses, and gave them to the Queen on his bended knee, Anno Domini, 1573":

> "Her inward worth all outward show transcends,
> Envy her merits with Regret Commends;
> Like Sparkling Gems her Virtues draw the sight,
> And in her Conduct she is always Bright,
> When she imparts her thoughts, her words have force
> And Sense and Wisdom flow in Sweet Discourse."

Among some wooden chests and cabinets, is an Aragon cabinet of chestnut, in two parts. The interior of the upper part contains a central door of Moorish architectural design and twelve drawers, all arcaded with spiral columns and plaques of ivory, richly gilt and diapered after the Vargueno-manner. The handles and clamps are of wrought and pierced iron. The ornamentation of the lower half, two drawers and two cupboards, is Gothic, richly gilt; its height is four feet seven inches; width, three feet five inches.

Among the medals is one in bronze commemorating the Restoration of the Roman Catholic religion in England, A. D. 1554; with Pope Julius II, accompanied by Mary, Charles V, Philip II and Cardinal Pole, giving his hand to a kneeling figure personifying England, by Cavino. A silver-gilt medal on the destruction of the Spanish Armada, 1588, has on one side, the Pope, kings, bishops, etc., seated in council; and on the other, the Spanish fleet driven against rocks. Another has the bust of the Queen and on the reverse, the sun shining on the ark on waves. This medal was distributed to all who had taken part in the attack on the Armada, and is the first instance of a naval reward medal.

The Exhibition is rich in manuscripts of various kinds, such as papal bulls, royal proclamations, letters, receipts, etc., of which we will merely enumerate a few: A bull of Pope Innocent VIII, confirming the marriage of Henry VII with Elizabeth of York. Letter with autograph signature from Charles V to an abbot at Metz, directing him to admit a certain man into his convent: one from Campeggio — Papal Legate in the matter of Henry's divorce from Catherine — to Francis II, Duke of Milan; an autograph letter from Katherine of Aragon, in Spanish, to her nephew Charles V, respecting the divorce, complaining of the delay, and asking him to persuade the Pope to give his decision, dated Buxton, 8 February, 1534; and one from Henry VIII to Grace, Lady Bedingfield, concerning the burial of Catherine of Aragon, spoken of in the letter as "widow and douagier of the right excellent prince, our derest and naturall brother Prince Arthur," dated at Greenwich, 10 January, 1536, with the King's signature. In a letter from Queen Elizabeth with autograph signature, she calls on Sir Henry Bedingfield to supply "one hable man" to go to Newcastle.

All the signatures of the period appear to be written with a very fine-pointed pen, and are a mixture of Roman and Italian characters.

There is a melancholy letter from Sir Walter Raleigh — from the Tower — to Sir Walter Cope, in which he begs, that, on account of his great poverty, his wife might "agayne be made a prisoner with me as she hath bine for six yeers last past." "A miserable sute it is, and yet great to me, who, in this wretched estate, can hope for no other thing than peacible sorrow." The letter concludes: "Sir, the matter is of no great importance (though a cruell destinie hath made it so to me) to desire that my wife may live with mee in this unsavery place. If, by your mediation I may detayne it, I will acknowledge in the highest degree of thankfullness, and rest reddy in trew fayth to be commanded by you — W. Raleigh." Dated 15 October — no year.

A sumptuary proclamation — 1517 — determines the number of dishes allowed at the dinner of the various grades of men, from cardinals, archbishops, dukes, downwards; disobedience being threatened with punishment at the King's pleasure to the "example of other that shal enterpresse any suche folyous and sensuall appetites hereafter." It was to take effect from the last day of May "the IX yere of the raygne of the King nowe our soueraygne lorde Henry the VIII."

There is also a sumptuary proclamation by Queen Elizabeth, controlling women's apparel. "Do as I say and not as I do," might very well have headed both these amusing documents. The woodcut and advertisement of a royal lottery, "all prices and no blanckes," is quaint in its way. There were to be "foure hundredth thousand and no moe lots"; the first prize was £5,000; the second, £3,500. The profits were to be devoted to the repair of the havens, etc.; and the lots were to be read by the Lord Mayor, on Lady-day, 1568.

There is just one warrant from Lady Jane Grey — about some tents — dated "July 19, I Jane (1553)" with the signature "Jane the Quene."

We close our brief survey of this deeply interesting exhibition, with a few remarks on what is by no means the least glorious portion of it, viz., that set apart to printed books. "At the accession of Henry VIII there seem to have been only four printers in England; before his death there were forty-five; of these, thirty-three appeared in the last twenty years of his reign, *i. e.*, during the time when he was gradually seceding from Rome and had begun to relax, in his arbitrary and vacillating way, the restrictions by which literary communication was fettered. The fourteen of the forty-five surviving when Edward VI ascended to the throne, were increased to fifty-seven during his short reign, and of these more than a half took part in the printing or publication of the Scriptures."

Beginning with these, as in duty bound, we may remark that, with the exception of one, lent by the Archbishop of Canterbury, and another by Sir Charles Dilke, all the seventeen copies of the Bible, in whole or in part, are lent by Earl Spenser; besides several prayer-books and missals.

In Tynedale's second edition of the Pentateuch, Numbers is in black-letter, the rest being in Roman type. Each book of the first edition was printed, for the sake of safety, at a different town, the second edition being these five books collected into one volume, which was said to have been printed at "Malborow, in the land of Hesse" as it was dangerous to give the real town. Its date is 1530. Next to this is the first edition of "Miles Coverdale's" Bible, the first complete bible printed in English, (partly in Paris and partly in London). It was published in 1537 with a dedication to the King and Queen; from this version are taken the Psalms still used in the Book of Common Prayer. And now editions follow each other fast. We have the fourth of Tynedale's New Testament, the Bible called "Matthew's" Bible, a fictitious name, as it was really edited by John Rogers, the first Protestant burnt in Mary's reign — these like all that followed, being revisions or copies in part of Tynedale's and Coverdale's. The "Great" Bible, is so called from its size, also "Cranmer's," as he revised and promoted the edition and wrote a Prologue. The New Testament here seen, and printed at Geneva, in 1557 — but not *the* "Geneva Version" which first appeared in 1560 — is interesting for the innovation of division into verses, and that of putting italics where the word does not appear in the original. It was a revision by Whittingham, afterwards Dean of Durham, and has a preface by Calvin; the "Geneva" Bible, known also as the "Breeches" Bible, was a very popular edition, being used in private long after the "Bishop's" was authorized to be read in churches. The latter edition was the work of more than twelve bishops, each of whom affixed his initials to the books he translated.

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The "Rheims" New Testament and the "Douay" Bible were translations for the use of English Catholics. Besides all these we have here the first edition of the authorized version, by James I; and the first edition of the "Irish" Bible, for which "Elizabeth gave the presses and types in the hope that some one would be raised up to undertake the translation." This was done by William O'Donnell, Protestant Archbishop of Tuam, and it was published in the beginning of the reign of James I. The list closes with a translation of the "*Fower Evangelists*" into old Saxon, collected from "Ancient Monuments" and a book entitled "*Here Begynneth the Pystles and Gospels, of every Sonday and Holy Day in the yere.*" Printed at Paris, 1538.

Perhaps nothing shows the oscillations in the doctrines of the church as by law established in England, so much as the different books of Prayers appointed to be read in churches.

There is a specimen of each exhibited, from the "Missal of Salisbury, unreformed and reformed," down to the "Exhortation unto Prayere thoughte mete by the Kynges maiestie and his clergie to be redde to the people in every churche afore processions," and the various Service-books of Edward VI; the list being completed by the Prayer-book of Queen Elizabeth, 1559; the copy of which here, has the signatures of the Lords of the Council, authorizing the price at which it should be sold.

We trust our readers will not fancy they are being inveigled into a dissertation on the forms of religion in Tudor times, since nothing is further from our purpose, still "as among the works couched in the living tongue the most important by far were those devoted to theology," they ought not, in fairness to themselves and the Exhibition, to be omitted. We notice, then, Henry the VIII's "*Defence of the Seven Sacraments.*" Copies of it were sent at once to the Pope and cardinals, besides some to be distributed among various princes and universities. The present copy has on the fly-leaf the words, "Regi Daciæ," and was probably given to the King of Denmark: it was printed in London, 1521, on vellum, and is beautifully illuminated in gold and colors. "*The Obedience of Christian Man, and how Christen Rulers ought to Governe*, 1528, printed by Hans Luft, Malborow in the Lande of Hesse" (like the copy of the Pentateuch), is the largest and most important of Tynedale's works, and is interesting besides, as being the book, of which a copy was given by Anne Boleyn to Henry. He read it with great interest, but in 1530, in a proclamation, it is mentioned among the "bokes of heresie worthy to be dampned and set in perpetual oblivion," that had recently been printed beyond seas. "*The Apology of Sir Thomas More, Knight, made by him Anno* 1533," after he resigned the Chancellorship of England, is the last of a controversial series between him and Tynedale. "*The Institution of a Christen Man contayning the Exposytion of the Commune Crede*," etc., was set forth by the bishops and clergy, but was superseded in a short time by "*Necessary Doctrine, etc.*," set forth in the King's name.

Besides these, we have Martin Luther's "*Chief Articles of the Chrysten Faythe*," etc., and "*Fruitfull Sermons*," by Hugh Latimer, Bishop of Worcester, printed thirty years after his martyrdom.

There is not much that calls for notice in the historical section, except the life and voyages of Sir Francis Drake, and Sir Walter Raleigh's "*Discoverie of the large, rich and bewtiful Empire of Guiana, etc.* Performed in the yeare 1595, by Sir W. Ralegh, Knight, etc."

Among the Belles Lettres the earliest work is Virgil's "*Æneid*," translated and printed by Caxton, having been revised by John Skelton. It is dedicated "unto the hye born my to comynge naturell souerayn lord Arthur, by the grace of God, Prince of Waleys," London, 1490.

A hundred years separate this from the next work exhibited, viz., the first edition of Sir Philip Sidney's "*Sonnets*," followed by the Countess of Pembroke's "*Arcadia*," written by Sydney for the amusement of her, of whom, long after, Ben Jonson wrote as:

> "The subject of all verse
> Sydney's sister, Pembroke's mother."

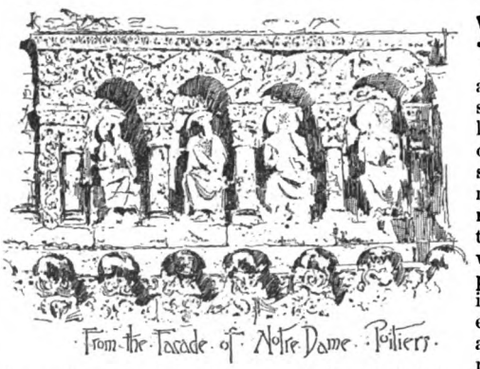
Of the works of Shake-Speare — as the name is spelt on one title-page — we have here his "*Sonnets*," printed 1609; the second quarto of "*A Midsommer's Night's Dreame*," 1600; "*King Lear*," 1608; and three copies of his plays: one of these — printed 1632 — has on the fly-leaf a note signed by Dr. Johnson, to the effect that it was given him by a bookseller, named Osbourn.

Of Spenser's works, we see the epithalamium on his own marriage, printed 1595; the first complete folio edition of his "*Fairie Queene*," 1609; and "*The Shepheard's Calender*, containing twelve œglogues proportionable to the twelve months."

This, his earliest work, was written at Sir Philip Sydney's house at Penshurst, in 1579. Leaving these poems, the glory of our English tongue, we find in another case, Garrick's copy of Ben Jonson's works, 1616, and "*Hero and Leander*, begunne by Christopher Marlowe and finished by George Chapman."

Science is represented by a French grammar written by an English graduate of Paris, who was French tutor to Mary Tudor before she became the wife of Louis XII of France; some anatomical plates — believed to be the first copperplate engravings executed in England; also by thirty-five maps of English and Welsh counties, 11½ x 16½ inches; and "*The Mariners' Mirrour*, a chart of the seas with soundings, etc., of the greatest part of Europe. Herein also may be understood the exploits lately atchieved by Sir Francis Drake." Printed at London, 1588.

THE DANGERS OF ELECTRIC-LIGHTING.[1] — I.



THE time has now arrived when it is absolutely necessary for the public generally to clearly understand one or two matters connected with electrical science, and we propose to explain to the uninitiated, certain electrical terms, and having explained them, to show what are the "dangers of electric-lighting," whether a high tension or a low tension system is used.

In the first place it is of primary importance to understand that, when dealing with an electric-current, two things require immediate attention; first of all, the "tension" or "pressure" of the current; and secondly, the "quantity," and to understand fully the meaning of the terms pressure and quantity, take water by way of illustration. With water no one has any difficulty in understanding that, with a pipe of a given size, and with water flowing through it from a cistern placed 20 feet above it, a certain quantity of water would flow through the pipe in a minute; but if the cistern were then placed 40 feet above the pipe, a considerably larger quantity of water would flow through the same pipe in a minute, this result being brought about by the extra pressure due to the water falling through 40 feet in lieu of 20 feet. Tension or pressure of an electric-current, technically called "volts," may be taken as similar to water-pressure. Now, with regard to quantity, here again a pipe of a certain size will, at a given pressure, allow a certain quantity of water to flow through it in a given time, and if the water-pressure be doubled, about twice the quantity of water will flow through it in the minute. So again with the electric-current, if a conductor, or bar, or tube of copper of a given size be taken, the quantity of current which will pass along it varies with the pressure, that is to say, that if the current is sent into the conductor with a pressure we will call one, a given quantity of current passes along the conductor in a minute, and if we have a pressure of twice one, or two, twice the quantity of current will pass along the conductor in the minute. Quantity is technically called "ampères."

We will now pass to another matter; we must consider what work — or useful energy — can be got out of a current. This is arrived at by multiplying the pressure and the quantity together, and the result is called "watts," and watts, therefore, represent the actual work — or energy — any given current will give. Now let us explain clearly what this means: A horse-power is a power capable of raising a weight of 33,000 pounds 1 foot high in a minute, and to perform this work 746 watts are required, that is to say, the pressure of an electric-current multiplied by the quantity must give the answer 746 to make the electric-power equal one horse-power; thus a current with a pressure 1 (1 volt) and with a quantity 746 (746 ampères) will equal one horse-power, or a current with a pressure 2 (2 volts) and with a quantity 373 (373 ampères) will also give one horse-power, as $2 \times 373 = 746$; or again, if we have a pressure of 746 (746 volts), and a quantity of 1 (1 ampère), the two multiplied together still give 746, and thus we should still have a power equal to one horse.

Now, it will be remembered that when dealing with water passing through a pipe, the quantity passed in a minute was about doubled if the pressure was doubled, therefore if you wish the pipe only to deliver a certain quantity of water in a minute or to do a certain work, the size will be reduced, if your pressure is increased. So with electricity, if you increase your pressure you decrease the size of your conductor, as the quantity of electricity always passing will be less, to do certain work.

To make ourselves clear, let us give an illustration: The pressure at which electricity is used ordinarily for lighting incandescent lamps is 100 (100 volts), and the quantity of current a 10 candle-power lamp consumes is .35 (about $\frac{35}{100}$ of an ampère), therefore, to light 5,000 of such lamps a current is required at the constant pressure of 100 (100 volts) and the quantity that would be required is $5{,}000 \times .35$ or 1,750 ampères, the energy consumed in watts being equal to the pressure (100 volts) multiplied by the quantity 1,750 ampères, the result is 175,000 watts.

Thus to light 5,000 lamps, the current being sent out from the central station at a pressure of 100 volts, a conductor would have to be provided which would carry in quantity 1,750 ampères; thus the pressure 100 × by the quantity of 1,750 gives 175,000 watts, the power required to do the work. Now, if the current were being sent out from the central station at a pressure of 10,000 volts, a conductor would have to be provided which would carry in quantity 17.5 ampères only, thus, again, the pressure 10,000 × by the quantity 17.5 would again give 175,000 watts, the power required to do

[1] By S. Z. de Ferranti and Francis Ince, in *Engineering*.

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the work, and the size of the conductors required, therefore, in the two cases to do the same work would be in the proportion of 1,750 to 17.5, that is to say, that with a pressure of 10,000 volts the size of the copper conductor would be about one-hundredth of the size required if dealing with a 100-volt current only.

It is now only necessary for us to point out one other scientific fact, and we shall then be in a position to clearly consider "the dangers of electric-lighting." That fact is that for heating purposes the quantity of the current only has to be considered, and not the voltage or pressure, as it is the passing of too great a quantity through a conductor that causes it to heat, and ultimately to melt, irrespective of the voltage or pressure, which has nothing whatever to do with the heating. A pipe, if too much water for its strength was being forced through it, would burst; the electrical conductor with too much quantity through it heats and ultimately melts. Thus, if a conductor is put underground of a size sufficient to carry current for 5,000 lamps only, and we turn on 10,000 lamps, the conductor will heat; and if we go on turning on more and more lamps, the conductor will ultimately melt at the weakest point, when the continuity of the conductor will be broken, no more current will be passed, the lights go out, and no further danger exists. Now, besides giving a conductor too much work by putting on too many lights, there is a second way in which an underground conductor may be made to do too much work, and so to heat or melt; that is to say, if the conductor is so constructed that it can, and is so placed in the ground that it may, and it does come into contact with another conductor, such as a telephone or telegraph wire, a gas or water pipe, the current will leak into and through such other conductor, and will find a short way back to the central station from whence it came, in preference to going through the lamps or doing other work, the resistance in going back through the earth by the short cut being less than the resistance of the work to be done. Just in the same way, if a pipe bursts, the water will spout out at the burst point in every direction, as the resistance is less at that point to the water than the resistance in the further length of pipe, if the water were to proceed to do its work. Again, as before pointed out, the pipe bursts under the pressure, but the main at the point of contact with another main or wire, where the rush of current takes place, heats, and finally melts, setting fire to or melting anything in its neighborhood. Here is the danger of fire. Now let us see how this danger is got over in this country. As before pointed out, if too many lights are put on any main or conductor, the main heats and finally melts at the weakest point; and in the second case, where the conductor comes across another conductor, as above pointed out, there is an enormous rush of current through the conductor, it heats and ultimately melts at the point of contact. Now, how is this danger to be entirely got rid of? This question is, in fact, answered by the above statement, which must be clear to any one, that when too many lights are turned on, the conductor heats and melts at the weakest point.

What have we to do then? We place at our central station, close to the dynamo which generates the current, the weakest point in every main or conductor that leaves the station; this weakest point is a short bridge of copper so slight and of a so carefully calculated capacity that if a conductor is of such a size that it should be used for lighting 5,000 lights only, if 6,000 lights are turned on, the rush of current is too great for the bridge, and it melts or fuses (hence the bridge is technically called a fuse), and that main or conductor is cut out long before any part of it even becomes warm; but you say, What occurs if it is not too many lights that are turned on, but is a contact, as suggested, with another conductor or a gas-pipe? Consider for a moment what happens at the point of contact; there is a too great rush of current to that point, and the result, therefore, is the same as turning on too many lights; if there is a too great rush of current from any cause it must all pass over the bridge into the conductor, and the bridge cares not for the reason that causes the great flow, but the great flow instantly causes the bridge to fuse, and with a conductor so arranged accident by fire is an impossibility. Mr. Edison has said, in a recent article by his pen on the same subject as that on which we are writing, that "near the corner of William and Wall Streets, New York, the underground conductors of the Edison Illuminating Company became crossed (by which he means they came in contact), and the current which was passing through them at a pressure of 110 volts melted not only the wires but several feet of iron tubing in which they were incased, and reduced the paving stones within a radius of three feet or four feet to a molten mass." Now, no man knows better than Mr. Edison that the tension of the current in the mains to which he refers had nothing whatever to do with the heating effect of the current; it was the quantity, and the quantity alone, that caused the heat. Now, if this main were lighting 5,000 lamps of 10 candle-power at 110 volts, the quantity of his current would have been, roughly, about 1,700 ampères, and by the contact, this quantity would have been enormously increased, whereas if he had been using a 10,000 volt current his quantity, as we have seen, would have been only 17 ampères about, and the heating power of this current would have been 100 times less; but where was Mr. Edison's bridge or fuse at his central station?

It is clear he could have had none, or it would have melted before any damage could by any possibility have been done; and his statement proves, as the reader will see, not that a higher tension would have been more dangerous (it would have been safer), but that the work at the station to which he refers must have been done on most incorrect and inefficient principles. Mr. Edison may argue that with increased pressure it is possible to force a greater quantity through a main, and that, therefore, a 10,000 volt pressure is more unsafe than a 100 volt pressure, but this is not the fact, as the conductor to be melted is in size only one-hundredth of the size of his main it will heat and melt sooner, and there is not the same quantity of molten mass to deal with; but the real answer is, that the bridge or fuse at the station, if used, is with either low or high pressure, the real safety, as it will never allow so large a quantity of current to pass over it as is necessary to cause the conductor to heat, no matter whether the pressure be 100 or 10,000 volts. Take again the calorific effect of the low tension system. We have seen that to do the same work, the low tension system requires 1,750 ampères against 17.5 on the high pressure, and thus if an accident does happen on the low tension system the immediate calorific effect of 1,750 ampères is called into play. Now, if on the high tension system such an effect could be reached, our engines would be called on to do an absolute impossibility, as they would be required to give 100 times their nominal power before the quantity and equal heating effect of 1,750 ampères could be reached.

Then comes the further question, How did Mr. Edison's mains become crossed, or rather in contact, with another conductor crossing his mains at right angles apparently at a street crossing? This must have arisen through the negligent way in which the Edison mains were placed underground without sufficient protection. It is idle to suggest that this is a danger that cannot be guarded against. It is easy enough to protect one conductor underground from by any possibility coming in contact with another crossing it, and we should be wasting the reader's time if we were to attempt to describe the thousand and one ways in which this may be done, for many ways will suggest themselves to every reader. But the further question arises, Is it not possible to construct your mains or underground conductors in such a manner that the passing of another main or conductor at an angle above and in contact with it will produce no harmful result whatever? The answer is Yes, distinctly yes.

[To be continued.]

WIND PRESSURE.

DOOR-PULL AT ULM

THE report of the Bidston Observatory for the five years, 1884–8, is mainly composed of meteorological observations from which it appears that the anemographs furnish very questionable data. The velocity of the wind has been computed on the assumption that the motion of the anemograph's cups is equal to one-third that of the air. The anemograph's pressure-plate presents a surface of two superficial feet to the wind. Both these anemographs are about 210 feet above the sea-level.

The investigations conducted by Sir G. Stokes tend to show that the constant for the cups is not 3 but more probably 2.4; and the experiments made by Dines establish the relation between the velocity and the pressure of the wind to be $P = V^2 \times .0035$ though hitherto it has been considered to be $P = V^2 \times .005$.

On January 23, 1884, the pressure of wind recorded at Bidston was 70.2 pounds per square foot, and the velocity 78 miles per hour.

Other extraordinary pressures, with accompanying velocities, are as follows:

	lb.	miles.
October 26, 1884	40.6	and 64
March 30, 1886	41.9	" 62
December 9, 1886	40.4	" 69
February 3, 1887	40.1	" 66
May 20, 1887	65.2	" 78
November 1, 1887	40 0	" 57
January 26, 1888	49.2	" 74
May 3, 1888	44.4	" 66
November 20, 1888	49.0	" 71

The five maximum pressures about 40, averaging 40.6, accompany consistently hourly velocities, averaging 64 miles. Now, if the constant for velocity must be reduced from 3 to 2.4, this 64 becomes 51 miles. According to the old formula, the pressure corresponding to 51 miles would be 18, and according to the new formula only 9 pounds, which numbers are in startling contrast to 40.6. Conversely, accepting 40.6 pounds, the velocity by the old formula would be 90, and by the new formula 108, which figures are in startling contrast to 64 miles. Hence, whichever way the data are considered, the results are eminently unsatisfactory. For a pressure of 70 pounds, the corresponding velocity would be 141 miles per hour by the new formula. Only the highest pressures have here been tested, but similar discrepancies prevail all through the series of these anemological statistics. Assuming these maxima pressures to be correct, then the given velocities are greatly in defect; but, as the factor 3 has been employed, which is now considered to be one-fifth too great, the given velocities are just as much too large. Hence

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that which is already great should be greater, an absurdity which leads to the inference that the instruments are unreliable. The mean velocity per hour is really given, whereas the absolute velocity, expressed as rate per hour, of the most violent gusts, lasting perhaps only a few seconds, is wanted. It seems too much of a stretch of confidence to accept the pressures as reliable, inasmuch as none so high have been obtained anywhere else. The inference, therefore, must be that the accuracy of the anemographs at Bidston, is extremely doubtful, and it becomes important to make these apparatus the subject of critical investigation. Until this has been efficiently done, no reliance whatever can be put upon their results, which is very much to be regretted, as the data extend over a long series of years, and if reliable, or could be made so, would be of the utmost scientific value. — *Engineering.*

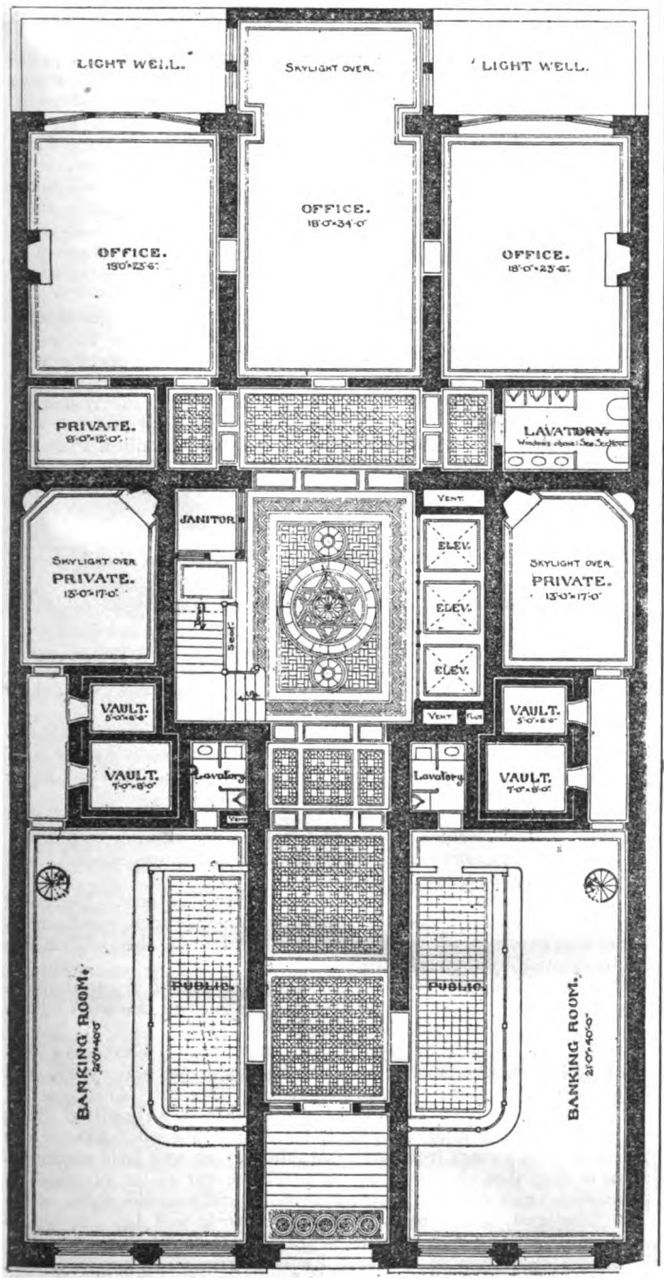
ILLUSTRATIONS

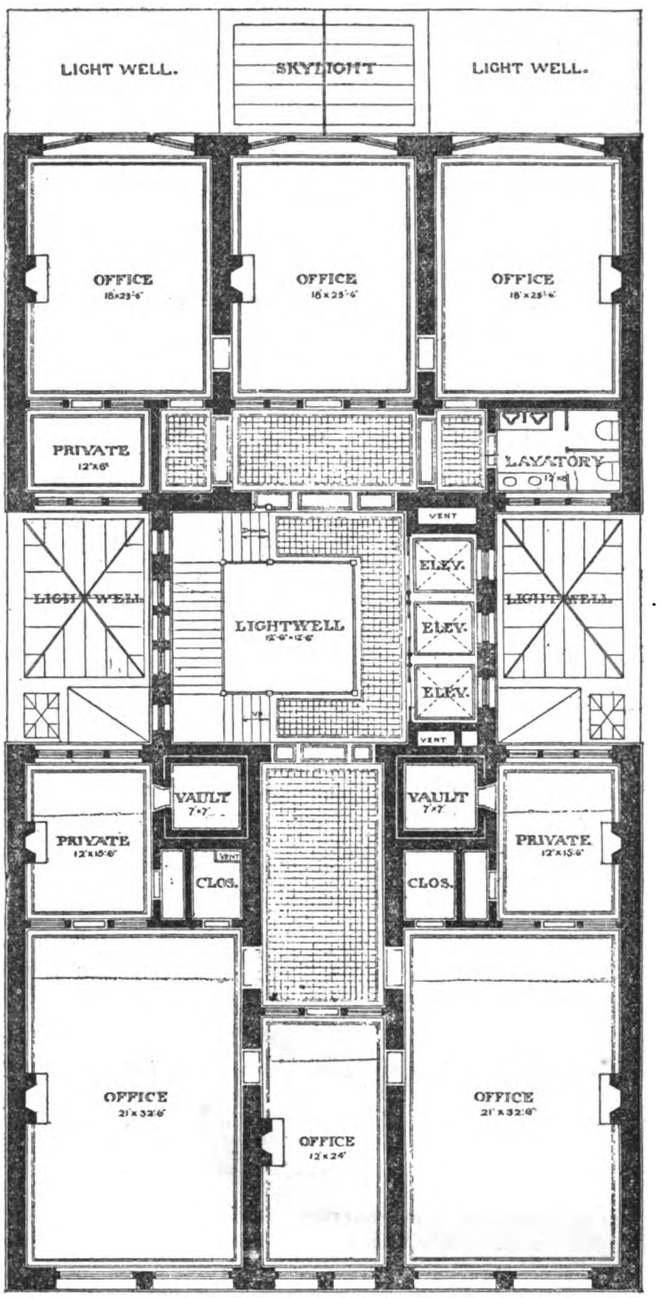
[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

HOUSE OF CHARLES HEAD, ESQ., BEACON ST., BOSTON, MASS. MESSRS. SHAW & HUNNEWELL, ARCHITECTS, BOSTON, MASS.

[Gelatine Print issued only with the International and Imperial Editions.]

THE J. J. VANDERGRIFT BUILDING, PITTSBURGH, PA. MESSRS. LONGFELLOW, ALDEN & HARLOW, ARCHITECTS, BOSTON, MASS.





DESIGN FOR PRESBYTERIAN CHURCH, EAST MINNEAPOLIS, MINN. MR. L. S. BUFFINGTON, ARCHITECT, MINNEAPOLIS, MINN.

DOORWAY FOR JOHN DWIGHT, ESQ., MT. MORRIS PARK, NEW YORK, N. Y. MR. FRANK HILL SMITH, ARCHITECT, BOSTON, MASS.

DESIGN FOR AN ENTRANCE TO A WORLD'S FAIR. BY MR. W. PELL PULIS.

SKETCH FOR A COUNTRY CHURCH. MESSRS. BALL & DABNEY, ARCHITECTS, BOSTON, MASS.

SIDEBOARD DESIGNED BY MR. JAMES THOMSON, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

THE GAS COMPANY'S OFFICE IN VIENNA — FORMERLY THE PALACE EPSTEIN. BARON DR. THEOPHIL HANSEN, ARCHITECT.

[Gelatine Print.]

THE admirable interior arrangement of this building which has a frontage on three streets may be seen by referring to the accompanying plan of the first story. In the basement is stall-room for six horses besides storage for fodder; an ice-room; large cellar-rooms;

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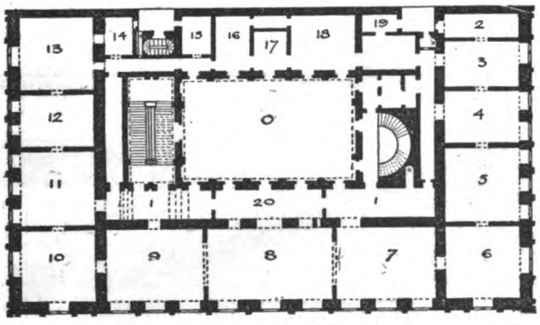
and the apparatus for heating the reception-room, ball-room, banquet-hall, winter-garden and the grand staircase hall. On the ground-floor are offices, carriage-houses and harness-rooms. In the first story are the dwelling-rooms which are artistically finished. Renaissance ceilings in stucco with frescoes by Bitterlich & Gripenkerl, richly-gilded walls, costly tapestry, etc. On the wall of the dining-room are landscapes by Hoffman. In the plan O is the court-yard; 1, entrance-hall; 2, room for a tutor or mentor; 3, room for the son of the house; 4, library; 5, study; 6, dining-room; 7, banquet-hall; 8, ball-room; 9, reception-room; 10, boudoir; 11, bedroom; 12, nursery; 13, room for daughter of the house; 14, governess's room; 15. bath; 16, dressing-room; 17, room for governess; 18, kitchen; 19, store-room; 20, winter-garden. The whole of the second story is intended to be rented to one family. The third story



is arranged for three separate tenants. This necessitates two separate staircases: one for the first story which is a straight flight richly ornamented with marble and sculpture, and a half-round flight for the two stories above. A third flight connects all the floors with the court-yard. The foregoing description, of course, refers to arrangement as originally planned. Since the building has been used for its present purpose many changes have been made.

PORTE COCHERE OF THE HOTEL OF MME. LA COMTESSE DE LAS CASES, RUE VANNEAU, PARIS.

[Gelatine Print.]

DESIGN FOR THE ENTRANCE TO A WORLD'S FAIR, SUBMITTED IN THE THIRD ANNUAL COMPETITION OF THE NEW YORK ARCHITECTURAL LEAGUE, BY MR. JULIUS HARDER, NEW YORK, N. Y.

To this design was awarded the Gold Medal.

CHATEAU DE LA FERE-EN-TARDENOIS, FRANCE.

SKETCH FROM DIJON. BY D. J. BLOW.

ARCADING, BEAUVAIS. BY D. J. BLOW.

CHURCH OF ST. JOHN THE BAPTIST, LOWER CAVERSHAM, READING, ENG. MR. F. PRIOLEAU WARREN, ARCHITECT.

On February 8, views of the exterior of this new church, with a description, were published.

BEDDINGTON NATIONAL SCHOOLS, BEDDINGTON, ENG. MR EDWARD CRUTCHLOE, ARCHITECT, LONDON, ENG.

This view shows an addition to the Church National Schools at Beddington, Surrey, which was carried out in the latter end of 1888. It consists of a large room 40 feet long, 22 feet wide and 14 feet up to wall-plate, with an open roof above, with two lobby entrances at the end. It is built with hollow walls in stock-bricks, with red brick dressings, and covered with Bangor slates. The room is warmed by a large open fireplace, with hot-air chamber at the back and sides, communicating with the room by regulating gratings, and ventilated by upright funnels leading in fresh air from outside the building, and by the upper portion of each window being made to open, and a funnel from the ceiling surmounted by one of Boyle's ventilators. The cost of the building, including a large block of latrines in the rear and some repairs to the old schools, amounted to 670*l.*

WALLINGTON SUNDAY-SCHOOL, CARSHALTON, ENG. MR. EDWARD CRUTCHLOE, ARCHITECT, LONDON, ENG.

This school was built last year at a cost of £700, and consists of one large room 50 feet long, 27 feet wide and 21 feet high to the ceiling; an entrance-porch in front and two class-rooms in the rear. It is built of stock-bricks, hollow walls, with red brick buttresses opposite the roof principals. The gable windows, copings and buttress-weatherings are in Bath stone. The roof is covered with slates, arranged in bands of different colors, and the warming, ventilating and lighting is upon the same principle as the addition to the Beddington Schools.

SOCIETIES

THE NEW YORK CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

The New York Chapter of the American Institute of Architects beg leave respectfully to protest against the measure embodied in Assembly Bill, No. 853, entitled "An Act fixing the salary of the Commissioner of the Capitol," for the following reasons:

1. The result of this bill would be to throw the design and construction of all State buildings into the hands of one man, selected, as a rule, for reasons other than the highest æsthetic and constructional ability.

2. The people of this State have a right to be properly represented in their buildings, which are the monuments by which they themselves are judged; and they cannot be so represented by any single person, whether selected mainly for political or any other reasons.

3. This bill deprives the people of the State of the services of the best members of the architectural profession, and provides an insufficient substitute.

4. The bill deprives the architects of the State of the natural rewards of eminence in their profession.

5. The bill would repeat in this State the evils surrounding the constitution of the office of the Supervising Architect of the Treasury in Washington, as admitted in official report for 1875, pp. 14 and 15.

6. The bill would create a centre for the distribution of patronage with all its attendant evils, to some of which the attention of the people has lately been directed.

7. The scheme of an official architect is more expensive to the taxpayers than if the State engaged the services of the best architects at the usual rates of compensation.

We respectfully submit that the appointment of an Architectural Commission or Advisory Board, consisting of three architects and two officials of the State would better serve to secure the best architectural results — the Commission to exercise in general all the functions of a building committee, where work is being done for a private corporation; and to be remunerated for their services.

Respectfully submitted, Emlen T. Littell, *President.*
A. J. Bloor, *Secretary.*

BOSTON ARCHITECTURAL CLUB.

The committees for the coming Annual Exhibition of the Boston Architectural Club, met Tuesday evening at the Parker House to compare notes and perfect the plans. The prospects are very encouraging, so that there is every reason to hope for a large and very interesting collection of drawings. Readers of the *American Architect and Building News*, will please bear in mind that all contributions should be delivered at the Club, No. 6 Hamilton Place, as speedily as possible, and not later than May 1.

R. Clipston Sturgis, *Secretary.*

The Boston Architectural Club proposes to hold an Exhibition of Architectural Work, in Horticultural Hall, for three weeks beginning May 12, 1890, and contributions are requested from all those who are interested in art and architecture.

The exhibits will be grouped as follows:

Section I. Sketches. Including work in this country and abroad, sketches of historical buildings, details, decoration, etc., also measured drawings of old work.

Sec. II. Architectural designs. Drawings of buildings designed by the exhibitor, either projected, in process of construction, or completed, including perspectives, working-drawings, studies, scale-drawings, interiors, and details.

Sec. III. Photographs of executed work. It is requested that a sketch-plan should accompany the photographs of each building.

Sec. IV. Interior work. Designs for furniture, decorations, carvings, ornaments, etc.

Sec. V. Special exhibits illustrative of the allied arts. Including examples of stained-glass, decoration, artistic ironwork, gas-fixtures, furniture, carvings, etc. The articles illustrated in this section are to be selected by the club.

Sec. VI. Students' work. Including the work of the students in the leading schools of architecture and design, and the work of the classes of the Boston Architectural Club.

Sec. VII. Works of the Rotch Scholarship. Envois of Mr. Harry Bacon, competition drawings for the present year, and selections from previous work.

Drawings must be delivered at the Club Rooms, 6 Hamilton Place, express paid, not later than May 1. There are no limits to the number of drawings from each exhibitor which will be considered. It is desired that all contributions be either framed, or mounted on stretchers or cardboard. Each drawing should bear the name of the designer and the draughtsman. All work will be subject to the approval of the Committee on Reception and Awards.

A full exhibition of the best English, French, Italian, German,

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and Spanish work is expected, and it is hoped that every city in the United States may likewise be fully represented.

By order of the Executive Committee,

R. CLIPSTON STURGIS, *Secretary.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

SLOW-BURNING CONSTRUCTION.

VICTORIA, B. C.

TO THE EDITORS OF THE AMERICAN ARCHITECT:

Dear Sirs, — Having read in the columns of the *American Architect* the discussions on slow-burning construction in connection with the recent Boston fire, with your permission I will give you my experience on the subject.

My first experiment in October, 1878, was on a small building 6′ x 6′, with ceiling 7′ high. The walls, ceiling and floors were constructed of three thicknesses of 1″ x 12″ boards (green), the joints lapped to centres in each course; the walls lathed on both sides with dovetailed lath, so that the mortar keys lay against the boards; the inner and outer faces of walls plastered with mortar composed of four parts of sand to one of lime, laid on three-eighths-inch thick. When the mortar was fairly dry, the structure was filled one-third full with dry fir wood, a hole 18″ square cut in one of the walls, and one 6″ square in ceiling. The wood inside was then fired. In twenty-five minutes from starting the fire the steam began to force the plaster off the outer faces of the walls; in thirty minutes the plaster began to fall from the inner faces of the walls; in forty minutes hot, dry smoke began to come through the joints of the boards on the outer face of the walls; in forty-five minutes the blaze began to come through the joints, and in fifty-three minutes the structure fell, the walls and ceiling almost wholly destroyed, the floor being but slightly damaged. I then built another structure of the same dimensions of 3″ x 12″ plank (green), the joints worked to close fit and splined; the walls and ceiling lathed and plastered as in first structure; the firing done in same manner, and with the same sort and amount of wood. In twenty-eight minutes the steam forced the mortar off the outer face of walls at nearly all the joints; in forty minutes the blaze was coming through all the joints freely, and in a little less than fifty minutes the structure was burned and separated in the joints to such an extent that it fell, although the planks, on their inner faces, were not charred more than an inch in depth. I then built another structure of the same dimensions with well-seasoned lumber, one-half the structure being of 1″ x 12″ boards, and one-half of 3″ x 12″ plank, with splined joints; construction and plaster same as in former cases, the plaster being thoroughly dried before firing. The fuel used was of the same sort and amount as formerly. In this case, there being little or no steam to force the mortar off, no ruptures occurred in the face of the walls for forty minutes from the time of starting the fire when the mortar began to crack and give at the spline joints. In fifty minutes smoke, and, in some cases, flame, was seen coming through nearly all spline joints. Up to this time the outer face of walls on the boarded portion of the structure was almost intact, although burned deep on the inside. In sixty minutes the plank portion began to fall, but the board portion of the building stood until burned to a shell, and then with but little damage to the mortar on outer face of wall.

From these experiments, I concluded, first, that *lath*, when applied to the face of walls, is expensive; that it becomes charred when exposed to a hot fire, falls off, taking the mortar with it, and exposing the wall to the direct action of the fire. Second, that thick, wide planks with spline joints, although well-seasoned before use, will shrink so much when exposed to a hot fire that the joints will open so as to give a strong draught to the fire, and thus hasten the work of destruction.

The next experiment was on a structure of the same dimensions as formerly: built of 2″ x 4″ scantling, with semi-dovetail grooves and tongues worked on their edges, which served the purposes of lath. These grooves were upwards of three-eighths of an inch deep, thus reducing the width of the scantling to about 3″. The scantling in the walls were laid one upon the other, and spiked at intervals of 18″ to 20″. In floor and ceiling the scantling were set on edge and spiked as above. The firing was the same as in former cases. In this instance the fire burned out in an hour and fifteen minutes, but did not penetrate to the outside of the structure, except through the vent-holes, that in the ceiling being burned from a diameter of six inches to three feet.

The plastering on outside of walls remained intact. The walls were charred and burned from 1½″ to 2″ deep. The great fire-resisting qualities of this structure were attributed to the large number of joints in a given space none of which from shrinkage opened sufficiently to produce a draught or permit the flames to penetrate to the outer walls as in the case of wide planks with splined joints. As the mortar key in this system of construction was not suitable for setting the scantling in a vertical position, considerable settlement would no doubt take place where the scantling were laid upon each other in partitions, etc., and fermentation or dry-rot to some extent was apprehended.

In order to obviate the drawbacks above enumerated and to produce economically the necessary building material, I proceeded to perfect the required wood-working machinery. The material can be manufactured from rough scantling ready for building purposes at the rate of sixty running feet per minute. Of this material I constructed a one-room building 10′ x 11′ inside; ceiling 10′ high; walls of 2″ x 4″ scantling set vertically.

The floor, ceiling and roof were formed of 2″ x 3″ scantling set on edge; door 2′ 6″ x 6′ 6″; windows in opposite side 2′ 4″ x 2′ 8″; scantling spiked together at intervals of 18″. The interior was plastered with brown mortar about three-eighths of an inch thick. The exterior had a scratch coat of brown mortar, composed of the usual proportions of lime and sand with one-seventh Portland cement added; the finishing coat being two of clean sharp sand to one of Portland cement, laid on about one-fourth-inch thick. Exterior work included a bracketed cornice of fair design, base, pilasters, door and window sills, lintels, etc.

The roof had one coat of concrete three-fourths of an inch thick, composed of clean gravel and Portland cement in proportions of one to five, finished with a coat of equal parts of cement and sand three-eighths of an inch thick, trowelled to a smooth hard surface. The building was fired with three-fourths of a cord of dry fir wood piled and set inside so as to insure good draught. The fire burned fiercely and spent itself in fifty-five minutes. On examining the interior after the fire it was found that most of the plaster had fallen and the walls and roof were considerably charred. The outer faces of walls and roof were not in the least damaged and the building without any repairs has ever since been used as an office by a house and sign painter. Buildings erected on the principles laid down have proved in every respect satisfactory while costing from two and one-half to five per cent less than the ordinary frame building covered with sheathing and weather-boarding or rustic. Critically inclined people predicted in respect to these buildings great shrinkage of timbers and cracking of plaster, but such predictions have not been in any measure verified.

The following are some of the many lessons I have learned as an eyewitness of burning buildings:

That where timbers cross each other and there is not sufficient weight to hold them to a firm bearing, the fire works into the joint and destroys them more readily than where the timbers lie side by side and are spiked or bolted together.

That where wooden beams rest on wooden posts fire does not work into the joint so readily as where the post rests on the beam.

That light ironwork in connection with wood work hastens the destruction of the latter, but where the ironwork is of sufficient body to absorb heat for a considerable time it retards the progress of the fire.

That wooden beams, usually termed bressummers, where they rest on brick piers and support the fronts of buildings remain in position and serve their purpose under conditions which would destroy cast and wrought iron beams of same strength.

That laminated timbers of given sectional area where their joints are bedded in mortar resist fire longer than solid timbers of the same total area.

SAMUEL C. BURRIS.

BOOKS.

NEW YORK, N. Y

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — If not too much trouble could you kindly let me know in which number of your paper you gave a list of the most important and necessary architectural books.

Yours truly, M. R. KRESS.

[In our issue for July 30, 1887. — EDS. AMERICAN ARCHITECT].

TO CALCULATE THE STRAINS IN A HIP-RAFTER.

NEW YORK, N. Y., April 2, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Can you inform me through the medium of your paper, where I can find explained, a method of calculating the stresses in a hip-rafter? By doing so you would oblige,

Yours truly, ROBERT D. KOHN.

[Kidder's "*Pocket-book*," Greene's "*Graphics*," or any other book treating of graphical statics, will give the principles needed for deducing the strains in a hip-rafter. — EDS. AMERICAN ARCHITECT].

A COLUMN CAPITAL FOUND AT SALAMIS. — At Salamis, in Cyprus, a big capital of a marble column has been unearthed, bearing a winged bull emerging as far as neck and wings. The latter form part of the architectural motive of the capital. Another side presents a caryatid passing at the waist into a floral ornament. These decorations are supposed to have been repeated on the two remaining sides. — *New York Times.*

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NOTES AND CLIPPINGS

Discoveries near Podgoritza. — It is reported from Cettinje that the excavations near Podgoritza, organized by Prince Nicholas in order to give employment to destitute laborers, have already brought to light the remains of the Basilica and the city walls of Dioclea, the birthplace of Diocletian. Many important and interesting inscriptions have also been disclosed. — *New York Evening Post.*

An Old New Mexican Idol. — An elliptical-shaped gray stone, probably two feet in length and about six inches in diameter, was received at the White House recently, accompanied by a letter from Governor Prince, of New Mexico. He stated that the stone was of the idol age, anterior to the arrival of the Spaniards in the Western continent, and it was known to be over three hundred years old. Among the Pueblo Indians the stone was venerated as a household god. — *Invention.*

The Panama Canal. — The *Revue Industrielle*, in discussing the Panama Canal fiasco, states that but little more than one-fourth of the work to be done, if the canal is to be completed with locks, has as yet been accomplished. The excavation still remaining amounts to upwards of 52,000,000 cubic yards, and in addition to this nothing has yet been done in connection with the regulation of the Chagres River. The work as it now stands has cost 60,000,000*l.*, which expenditure the *Revue* holds is difficulty to justify and attributes mainly to the wastefulness of the contractors and the inefficient superintendence of the engineers in charge of the work. — *Engineering.*

Astonishing Force of Sea Waves. — Some idea of the power exerted by sea waves may be formed from the following facts: An iron column, twenty-three feet long and weighing 6,000 pounds — part of a light-house being built — was, in course of operation, landed at Bishop Rock, England, and, a storm coming up, was left lashed by a chain at each end to two strong eye-bolts. Three days after, when the storm had abated, it was found that the great column had been moved a distance of twenty feet and landed on top of a projecting rock. A blacksmith's anvil, weighing nearly 200 pounds, and sunk in a pit three and one-half feet deep, had been washed entirely out of the sink and landed near the column of iron above mentioned. It had been floated nearly 200 feet after being lifted out of the hole. — *New York Commercial Advertiser.*

Industrial Exhibition at Stockholm during 1892. — An industrial exhibition will be held at the Swedish capital during 1892, a remarkably well-positioned site in the proximity of the town having been fixed upon. A committee has been considering the financial question of the matter, and arrived at the result that the expenses would be likely to exceed the profits with 1,200,000 kr. This deficiency is proposed to be covered by a grant from the State of 400,000 kr. (half to be taken from the Industrial Manufacture Fund), by a grant of 300,000 kr. from the city of Stockholm, and the balance of 500,000 kr. it is proposed to raise through a lottery. Stockholm is a beautiful town, and the Swedish manufacturers are sure to exert themselves, so the exhibition should become one of some interest even in these days of excessive exhibitions. — *Engineering.*

Iron in Roman Masonry. — In old Roman masonry work, says *Engineering News*, the several blocks of stone were united by strong iron clamps, which effectually prevented the formation of cracks. To avoid corrosion of these clamps they were thickly coated with lead, which seems to have proved an excellent protection. Recent excavations near Moirans, France, which laid bare the remains of some Roman water conduits, are said to show this in a striking manner. Several large square blocks of dressed stone, weighing in the neighborhood of a hundredweight each, which were there found, were united by such lead-covered clamps, which had become so firmly imbedded that the blocks could be separated only by blasting. The iron, even after the lapse of eighteen centuries, is said to have been in a good state of preservation.

Ancient Furniture in America. — A few years ago agents used to be sent all through the rural parts of New England to pick up superannuated furniture of every kind — such as was found astray in farmhouses, village attics, country hotels and elsewhere, having been handed down from generation to generation in the families of long resident natives. The latter were usually willing enough to part with the treasures, which were only valuable in the eyes of people of æsthetic tastes, and the dealer paid a mere song for the articles, reaping a big profit. But now the supply obtained in this way has been practically exhausted. Now it is the fashion for rich Yankee people to have in their houses one or two apartments in the old colonial style, with floor and walls of dark oak, massive rafters, huge fireplace, mahogany furniture, and an occasional spinning-wheel. There are not nearly enough of these precious relics to go around, so it is a blessing that provision is made for reproducing them indefinitely at comparatively cheap rates. The most approved method of giving a floor or wall a look of old age is to scrub it at intervals with gallons of old ale. This produces a fine effect. Mahogany is generally used for the manufacture of antique pieces of furniture. In its natural state it is no darker than black walnut, and to make it of the proper hue staining must be resorted to. If oak is wanted, it is rubbed with common shoe-blacking, and the usual wax finish put on afterward. This is warranted to add fifty years to the apparent history of a bureau or desk in one hour. For the inside works of the desk or bureau pine is employed, and this is given the requisite look of antiquity by repeatedly firing a shot-gun loaded with nothing but powder, and plenty of it, into the drawers and around them until the surfaces exposed are sufficiently discolored, and all full of those curious indentations which ordinarily indicate age. Another process is to wash the drawers, etc., with a coarse sponge dipped in powerful acid, which eats wood here and there, and effects the same result. Brass fittings are manufactured in all the ancient designs that were ever used. In order to make them look dull and old, the moulds in which the brass is cast are rubbed and chipped somewhat, and in them a little gunpowder is placed and fired with a match. This occasions a discoloration, which seems to betoken the action of time's gnawing teeth, and the same is warranted to last until the merchandise is sold, though not much longer. A special branch of the work has to do with clocks of the ancient upright pattern, which are copied in every detail from the really old ones. Even the metal faces, with their curious numerals, are imitated, and the works of modern pattern are permitted to lie in a dusty corner and oxidize comfortably while the framework is in process of construction. There is nothing, the makers say, in the line of back-number furniture that cannot be reproduced at a few days' notice from brand-new materials, and yet so like the old that no ordinary person could possibly tell the difference — *Building World.*

TRADE SURVEYS

Allusion was recently made to the fact that somewhat radical or even revolutionary schemes for banking were receiving the apparently serious consideration of legislators in high position in the national councils. Another proposition looking to the same end has recently been introduced into the Senate, which aims at providing a system of banking which will make the borrowing of money at a low rate of interest much easier than at present. The scheme contemplates the establishment of branches at post-offices throughout the country, and loans to be made upon security, the character of which is not clearly defined. It is the old greenback idea revived, but this time it is presented with the approval of a much larger constituency. The farmers' organizations and the labor organizations are working in unison for some modification of the existing banking system which will destroy, as they claim, the present monopoly enjoyed by national banks. Throughout the East such schemes and propositions receive but very little attention. Throughout the West they are earnestly considered by a very large body of people, and politics has very little to do with it. The growth of sentiments or theories of this sort is somewhat remarkable. The idea is very deeply imbedded in the minds of the producing and hard-working classes generally that our recognized system of banking is to a large extent based upon injustice. It will not do to simply argue these propositions down in Eastern financial papers and magazines, for the rank and file, especially in the Western States, are doing their own thinking, and are obtaining the assistance of very reputable leaders. This movement is part and parcel of the granger movement, and grows out of it. It has the endorsement of the Supreme Court of the United States, with but one dissenting vote, and the approval of a vast body of business interests which are suffering every year more and more from a dearth of currency. It would be well for our self-satisfied managers of financial affairs to at least keep track of the growth of this sentiment. The volume of business, as compared to last year, is a little heavier, as shown by bank clearings, which are in the ratio of 90 to 85. With this expansion of trade there has been a quite general, but not universal, decline in values. This decline is attributable in large measure to the increased production, or, perhaps, more properly speaking, to increased producing-capacity. A portion of the increased activity is, no doubt, due to the assistance of foreign capital; but the influence of foreign capital is frequently over-estimated.

The volume of freight moved by rail is increasing as compared to corresponding weeks last year. The supply of building material is very heavy, and, generally speaking, is a little lower in price than last year. Building permits were not quite as numerous during March as had been anticipated, but the deficit was due to unfavorable weather. Our advices from a large number of building centres, up to date, confirm the previously expressed opinions and statements as to the magnitude of building operations in all sections of the country. Iron and steel material for construction purposes is in urgent demand. The pig-iron output is increasing. Crude iron and steel have decreased in price $2 to $6 per ton since the opening of the year. Twenty-eight new and thoroughly equipped blast-furnaces will soon be blown-in in the Southern States. Upwards of 1,100,000 tons of steel-rails have been sold this year out of an aggregate producing-capacity of some 2,600,000 tons. The car-builders, with very few exceptions, are crowded with orders to supply rolling stock for railroads. The locomotive-builders have increased their supply of work to be done, and there is a general movement among railroad-managers to add to their capacity to move freights, in view of the steady increase in traffic. It is impossible to say, just at this time, to what extent the decline in prices of iron and steel has been due to the building of new mills and furnaces. The opinion was very widely entertained, a few months ago, that so far as iron and its products were concerned, there would be a steady advance in prices throughout 1890, as the correlative of a steady expansion in demand. Notwithstanding the threatenings that have been given out by labor organizations for a year past, the fullest preparations have been made for building houses, factories and mills, and the work has been undertaken. There are signs of a good deal of commotion in the labor ranks, but, after all, the outcome will not be a tithe of what was at first feared. As usual, the turbulent workmen of Chicago take the lead, and the builders and employers there are showing a remarkably bold front in view of the vastness of the interests at stake. At Philadelphia, the striking fever will manifest itself chiefly in a grand parade and public meeting, wherein clerical and municipal magnates will vie with labor leaders in grandiloquent talk. In New York the workmen do not seem to know just what they will do; but their employers are not disconcerted. Throughout the South there will be scarcely any trouble. Among the shop-workmen of the New England States, there is very little disposition to engage in any general movement to unsettle existing conditions.

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MINNEAPOLIS MINN·1888·

·DESIGN·FOR·PRESBYTERIAN·CHURCH·
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Frank Hunt Architect

SKETCH · OF · DOORWAY
HOUSE FOR · JOHN · DWIGHT · ESQ.
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3d ANNUAL COMPETITION.
OF THE A.I.OF.N.Y.
ENTRANCE TO A
WORLD'S FAIR.

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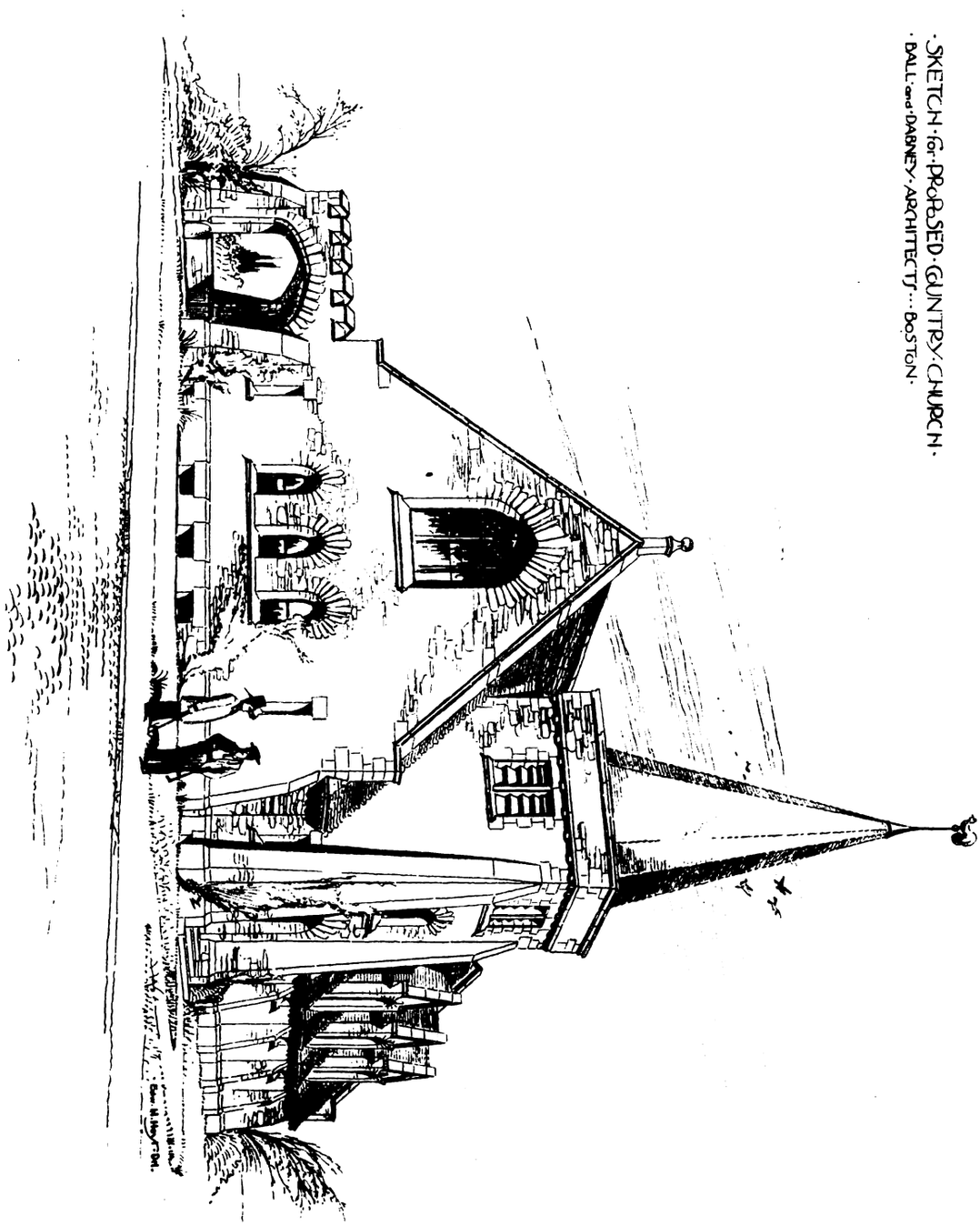

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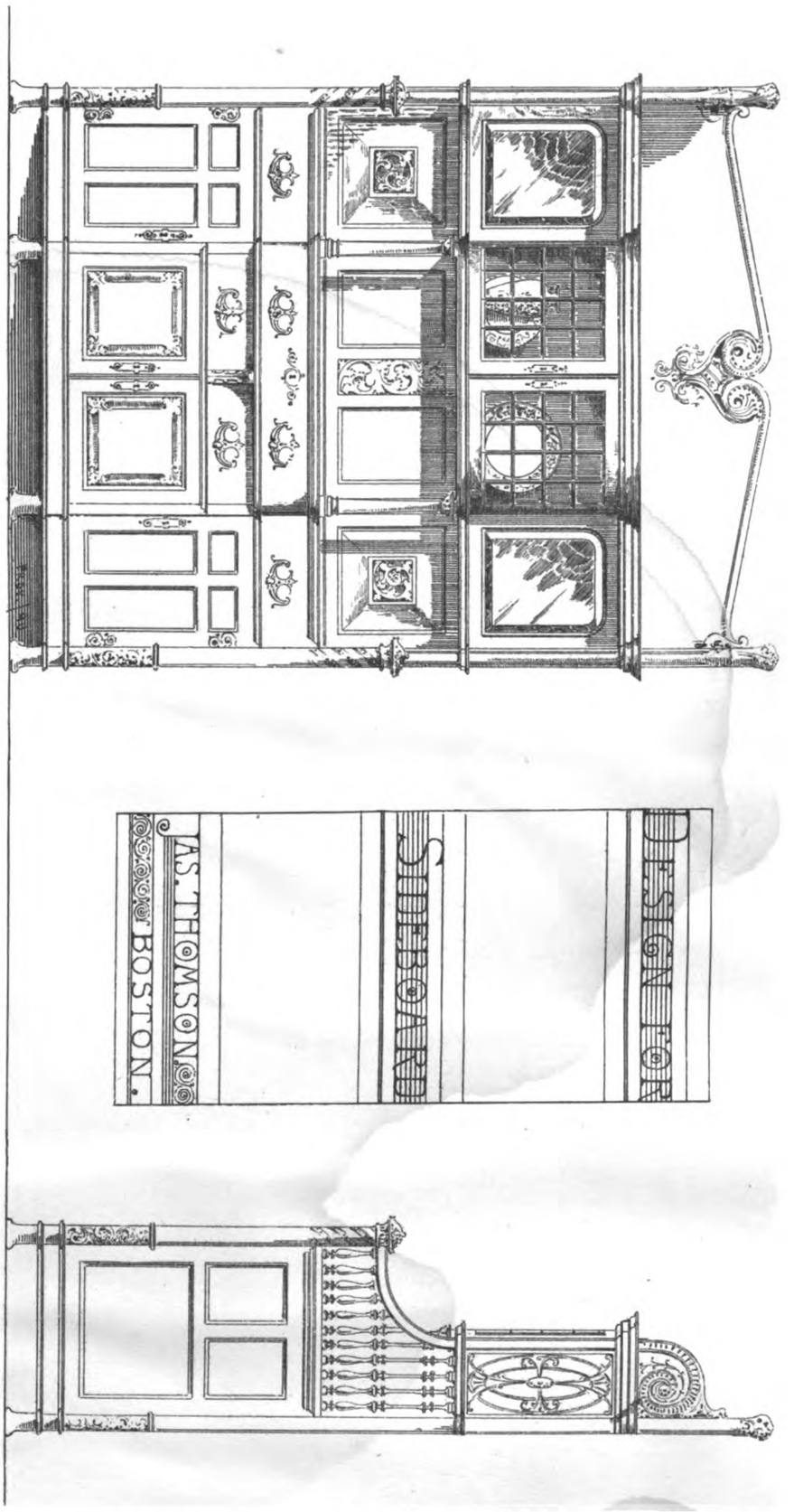

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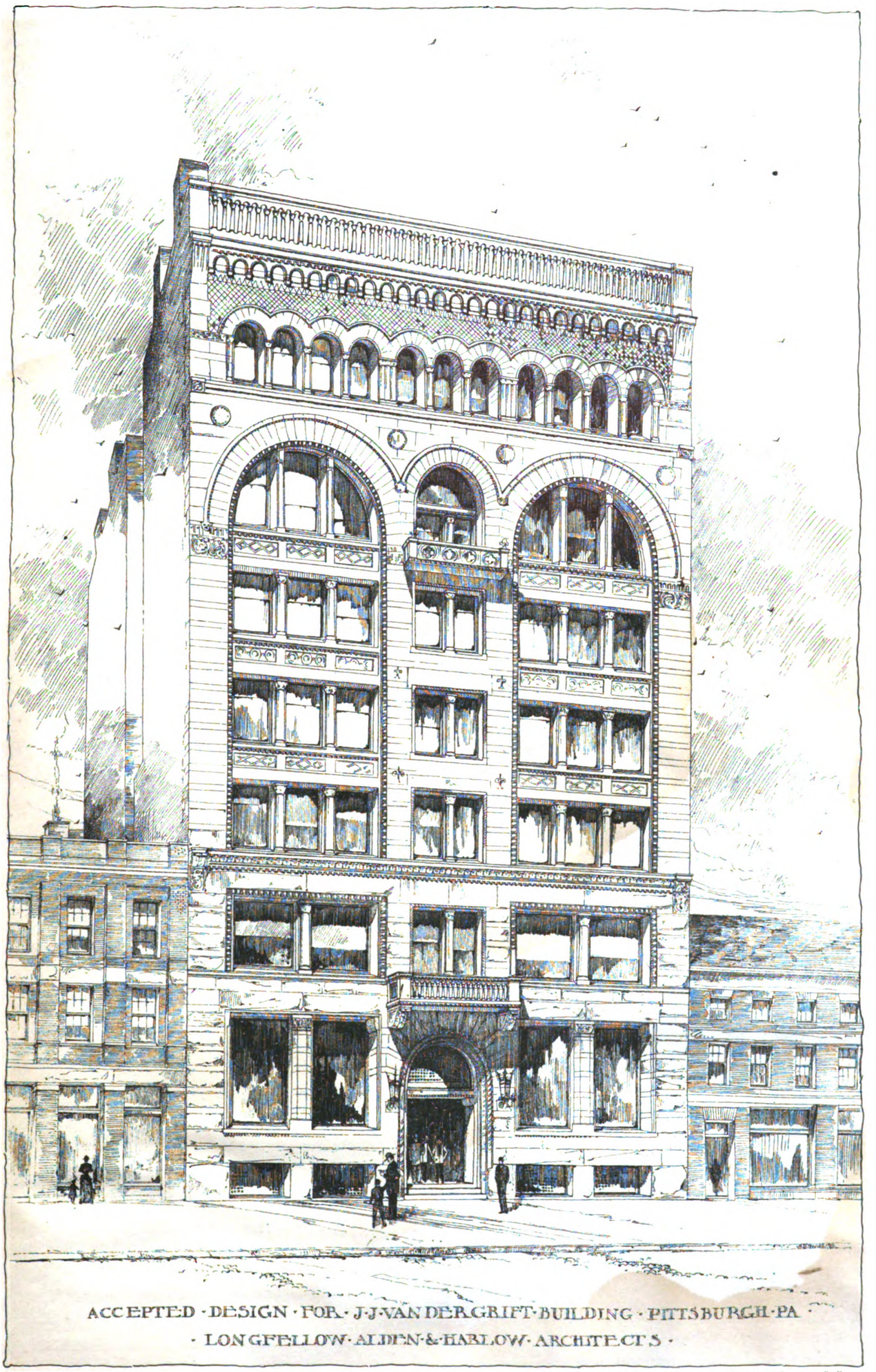

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MR. THOMAS WALSH, a well-known architect of St. Louis, died recently in that city at the age of sixty-five. Mr. Walsh was an Irishman, from Kilkenny. He came to America in 1852, and soon settled in St. Louis, where he built up a prosperous business. He designed the Custom House, the Insane Ayslum, the Poor-house, the Polytechnic School, the first St. Louis University Building, the Four Courts, St. Xavier's Church, and many other important structures. He leaves only one son, Mr. Robert Walsh, also an architect.

ALTHOUGH no site has yet been chosen for the Exhibition at Chicago, plans for the buildings are being submitted and discussed. One of these, which, from the description, appears to have been the work of an architect who knew something of the subject, instead of a mere lunatic, like the authors of some of the schemes mentioned in the newspapers, is that of Mr. Jennison, which proposes a sort of circular tent of iron, supported in the middle by a shaft, of railroad iron, hooped with iron bands, and stiffened with wedges. This shaft is to be sixty feet in diameter, and fourteen hundred and ninety-two feet high, and from a point some distance below the top ropes of wire are stretched radially to the ground, and support the roof, of corrugated iron and glass. To economize space, there are several stories in the building, and there seems to be no serious difficulty about the construction. For the arrangement, Mr. Jennison proposes a modification of that of the Paris Exhibition of 1867, the plan of which is usually attributed to Prince Napoleon. Under this arrangement, the idea of which was certainly very ingenious, the various countries occupy pie-shaped sections of the floor space, while the different arts and sciences occupy concentric rings. By this disposition, if a visitor wishes to study, let us say, the manufacture of iron, he has only to find the circular aisle devoted to the subject, and follow it around the building. When he has made the round, he will have exhausted the subject, and, in passing through the sectors allotted to the different countries, he will have seen the iron manufactures of each nation separately. On the other hand, if a visitor wishes to study, for example, the art and industry of Russia, he goes to the centre of the building, finds the Russian sector, which is clearly distinguished, by wide radial aisles, from the neighboring countries, and, keeping within these boundaries, inspects every variety of Russian product, until he arrives at the outside wall of the building. Although there is a fascinating clearness and simplicity about such a scheme, it was not very successful in Paris, on account of the inequality of development of the arts in different countries. If Russia, for example, with a small show of iron industry, and a great exhibit of food products, were put next to Belgium, with an immense display of manufactures of iron, and little agricultural attraction, it is evident that, if the radial divisions were kept straight, which would be essential, either the Belgian iron exhibit would have to be abridged, or that of Russia would contain large empty spaces, and the case would be reversed with agricultural products; so that, even with the utmost care in fitting the space to the exhibits, a great deal of room was wasted. It is quite possible that Mr. Jennison, with several stories of circular halls so divided, might sort out the exhibits so as not to lose space; and if so, the convenience of visitors would certainly be promoted.

THE carpenters' strike, which has been going on for some time in Chicago, appears to be one of the most serious yet experienced in the building trades, and perhaps many millions of dollars, which had been intended for investment in buildings, and would thus have been distributed among the carpenters, masons, plasterers, plumbers, painters, architects and so on, of the city, have, in consequence of the uncertainty about cost and renting caused by the strike, been diverted to other enterprises, and are now being used to buy coal lands in the South, or railroad stocks, or shares in copper mines. The carpenters in Chicago are very thoroughly organized, nearly all being members of the Union, and faithful subjects of the walking-delegate, so that, although forty-five and fifty cents an hour has been offered for carpenters by contractors who were pressed for time, it has been refused, and not more than a dozen men are said to be at work in the city. We cannot say just what may be the condition of the Chicago unions, but we are quite sure that a condition under which an offer of fifty cents an hour for carpenters' labor finds no one to accept it will not last very long. Even if the spiritless slaves of the labor demagogues are afraid to take advantage of it until their masters give the signal, there are plenty of other men in this country who are willing to take opportunities as they see them, without waiting for the word of command, and these men will sooner or later take the control of the building trades from the foreign-born schemers who now infest them. It does not need a very penetrating mind to see that associations, comprising masons, carpenters and other building mechanics, accustomed to working together for their mutual advantage, and intelligently directed, might reap a golden harvest from the annual commotions which now so seriously interfere with the improvement of real-estate. Under circumstances such as now prevail in Chicago, they might take their pick of buildings, which they could contract to finish at their own price; and even in competing for work at ordinary seasons, they would have a great advantage, in being able to contract positively to complete their work at a fixed time, without reference to the whims or necessities of walking-delegates, and would enjoy a deserved preference on that account. That the formation of such working syndicates will not be long delayed, seems already probable, and every new antic of the union leaders in the way of upsetting contracts by malicious strikes, or the compulsory shortening of the hours of labor, increases the demand for the services of mechanics who can understand and keep an agreement; who are their own masters, and can, and will, fulfil their promises to the letter; and who are not afraid to work eight, nine, ten or twelve hours a day, if it should be necessary to do so to carry out an agreement, or if any one should be willing to pay the price asked for such service.

CONGRESS appears to be disposed this year to revoke the duty on foreign works of art. The Committee of Ways and Means has, in its tariff, placed all works of painting and sculpture "by professional artists" on the free list, the reservation that the objects shall be "by professional artists" being apparently intended to prevent the free importation of

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pig lead cast in moulds faintly resembling a human form; and there will hardly be much opposition to this clause in either house. So far as the Executive Department is concerned, the President has already sent a special message to Congress, advising the repeal of the duty, and the representatives of foreign Governments have said so much about the duty, and, we imagine, made it look so ridiculous, that legislation to abolish it will be heartily carried out by the Administration. A story, which reads like a Washington joke, is in circulation, to the effect that attempts have been made to negotiate a sort of reciprocity treaty with France, by which French pictures and statues are to be admitted free to this country, on condition of the removal of the French duties on American pork. No doubt the exchange of hogs for art would be advantageous to both countries, but the proposition is not an extremely dignified one. However, we can do without the dignity, if we can get our pictures free. The fact that the duty was likely to be repealed has undoubtedly, during the past few years, prevented persons, who could afford to pay the extra price, from buying articles which would soon be worth only three-fourths as much as they paid for them; and the change in the law, if passed, is likely to lead to a great demand for foreign works of art.

CARPENTRY AND BUILDING offers two prizes, one of one hundred dollars, and a second of fifty dollars, for the best essays on the subject of "A Builders' Exchange," containing suggestions as to the mode of forming, governing and utilizing such an organization. The competing essays are not to exceed two thousand words in length, and must be marked with a motto or device, and sent, with the name and address of the author in a sealed envelope, bearing the same motto or device, to A. O. Kittredge, Editor *Carpentry and Building*, 66–68 Duane Street, New York. The right is reserved to publish any or all the competing essays. Illustrations or diagrams may be introduced if desired; and all competing essays must be received at the office of *Carpentry and Building* not later than the hour of closing business on May 10 next.

THE *Engineering and Building Record* has recently held a competition for designs for a water-tower and pumping-station, which has called out some very clever sketches. For the water-tower, the first prize was carried off by Mr. Elmer Grey, of Milwaukee; the second by Mr. James C. Green, of Brooklyn; the third by Mr. R. C. Spencer, Jr., of Boston; and the fourth by Mr. J. A. Schweinfurth, of Boston. Among the designs for the pumping-station, that of Mr. Elmer Grey took the first prize, while Mr. James C. Green received the second, Mr. R. C. Spencer, Jr., the third, and Mr. J. A. Schweinfurth the fourth.

A LITTLE politico-economical comedy is being played in Maine, in connection with the attempt, which we mentioned two or three weeks ago, to have the duty on lime increased, for the benefit of the associated producers of Rockland and Thomaston. As the proposed increase in the duty, and the consequent raising of the price, would bring a considerable profit to the association of lime-manufacturers, it is not surprising that some of their neighbors and friends have cast about for means by which they may share in the golden shower, and it has occurred to the owners of woodland in the vicinity, who furnish the lime-burners with wood for their kilns, to petition for the imposition of a duty on such material, which will enable them to put up their price considerably, without fear of having wood come in from the Provinces to spoil their monopoly. There seems to be no reason why the woodchoppers have not as much right to be protected as the lime-manufacturers, and we suppose that the latter think that the builders and plasterers ought to pay tribute to both of them without complaint; but there is sure to be strong opposition, among a very influential class, to any legislation intended to increase the cost of building for the benefit of a small group of manufacturers.

A CASE which recently came up in Washington suggests a question in regard to party-walls which is of very great importance as a matter of construction, although it has, so far as we know, never been mentioned in a court. It seems that the regulation in regard to party-walls in the District of Columbia was composed, or, perhaps, copied from some regulations existing in Philadelphia, by no less a person than President Washington, and his rule has been the law ever since. Under this, if a person puts part of the foundation of his wall on his neighbor's land, that neighbor is entitled to use the wall above ground as a party-wall, even though the wall above the foundation may be wholly on the land of the one first building. To architects, this view of the matter will seem very reasonable, and it would certainly be of advantage to the art of construction to go still farther, and to say that, at least in certain localities, every wall built within two feet of the boundary line between two adjacent properties should be built with its centre on the boundary line, and made a party-wall. The reason for this is, of course, that no wall is properly built, the centre of which does not stand over the centre of its foundation; and that, where two independent walls are built on adjoining properties, close to the boundary line, both of them must, under the most favorable conditions, stand on the extreme edge of their foundations, at the imminent risk of causing the footings to tilt, or "roll," producing settlements and cracks, and bringing about ultimately the destruction of the wall. In practice, however, the first comer always gets his footing-stone a little over his neighbor's line, and, when the latter builds, he is obliged either to have the first footings cut off, endangering the old wall, or to set his own footings back, and build his wall overhanging them, at the great peril of his own construction. The matter is particularly serious with pile foundations. In this case, the first one to build always drives a row of piles tangent to the boundary line, and his wall above ground rests vertically over this row of piles, the second and the third row of piles, driven parallel with the first, helping to carry the load, but in an indefinite degree, depending on the bonding of the footings and other circumstances. When the second proprietor comes to build, however, and finds the first piles driven close to the line, he is prevented from following a similar course on his own side. Not only does the form of the pile-driving machine render it impossible to get it near enough to the existing wall to drive piles vertically within six or eight inches of the line, but it is difficult and dangerous to drive even so near as this, and, in practice, the nearest row of new piles is often driven a foot or more back from the boundary line. When the remaining rows are driven, the footing courses laid and the superstructure begun, the new wall, if it is built close to the line, as it usually is, stands over nothing, the nearest row of piles, of the three which are supposed to support it, being some distance back from the line of the wall. It is marvellous that walls constructed in this way, of which there are hundreds, stand at all, and they would probably not do so, except for the support which the second wall gets from leaning against the first; yet the only alternative is to drive the piles for the second wall obliquely, so as to crowd them in among those intended for the first wall. This method, although often followed, is, in most cases, even worse than the other, as it brings the new wall on an inclined support. The best course in all such cases, and the one which should be required by law, is to arrange the piles and the footings as if for a party-wall, building the wall above ground on the party-line or not, as circumstances may require. The last comer, in case he wishes to erect a heavy building on his side of the line, can drive additional piles, and, by the arrangement of the footings, utilize them, as well as those already there, to support his wall, which will thus rest nearly on the middle of the foundation, and be under conditions favorable for stability.

THE time for submitting designs for the Quebec City-hall has been extended to September 1 next. It is said that more than a hundred architects have written for copies of the conditions of competition, but we imagine that most of them, after reading the conditions, have let the matter drop. On the principle, however, that "it is never too late to mend," we would suggest that between now and next September there would be time, if the Corporation of Quebec really wishes to enlist the interest of competent members of the profession, to amend the conditions in conformity with the terms now insisted upon by all reputable architects in this country and in England. It is reasonable to suppose that a city-hall designed and executed under the care of a first-rate architect will be more economical and satisfactory than the production of a person not recognized in the profession as an architect at all; and if the first-rate men are to be expected to compete, they must be offered such terms as they have expressed their willingness to accept.

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RELIGIOUS ARCHITECTURE.[1] — II.

I. RELIGIOUS ARCHITECTURE OF ANTIQUITY. — EGYPT.

Monument to Quintin Matsys, Antwerp. De Braekelaar, Sculptor.

IN prehistoric times, the inhabitants of Egypt, which was already organized into a State, lived under the domination of their priests. At a date somewhere between 5000 and 3500 B. C., Menes, or Mena. succeeded in overthrowing this rule, and founded the Egyptian monarchy.

"It lasted four thousand years at least,[2] under thirty consecutive dynasties, from Menes to Nectanebo (340 B. C.). This interval of time, the longest recorded in history, is ordinarily divided into three parts: the Ancient Empire, from the first to the eleventh dynasty; the Middle Empire, from the eleventh dynasty to the invasion of the Hyksos, or Shepherd Kings; the New Empire, from the Hyksosite invasion to the Persian conquest. This division has the disadvantage of not sufficiently recognizing the march of history.

"In fact, three great revolutions took place in the historic life of Egypt. At the beginning of human monarchies (like other nations, the Egyptians headed their kingly dynasties with a long line of divine rulers), the country's centre of gravity was at Memphis; Memphis was the capital and the tomb of the kings; Memphite sovereigns were imposed upon the rest of the land, and the city was the *entrepôt* for commerce and Egyptian industry. Toward the sixth dynasty, the centre of gravity was displaced and moved southward. Pausing first at Heracleopolis, in Middle Egypt (ninth and tenth dynasties), it was finally fixed at Thebes during the eleventh dynasty. From that time Thebes became the real capital of the country and the nursery of its kings. With the exception of the rulers of the fourteenth or Xoite dynasty, all the kings from the eleventh to the twenty-first dynasty were of Theban origin. When the Shepherd Kings invaded Egypt, the Thebaïd became the refuge of Egyptian nationality, and its princes, after centuries of struggle against the conquerors, succeeded in emancipating all the valley of the Nile in favor of the eighteenth dynasty; this opened the era of the great foreign wars.

"Under the nineteenth dynasty, a reverse movement to that which had taken place toward the end of the first period gradually carried the centre of gravity back to the north of the country. With the twenty-first Tanite dynasty Thebes ceased to occupy the rank of capital, and the Deltaic cities of Tanis, Bubastis, Mendes, Sebennytus, and especially Saïs, disputed for the honor. Thenceforth all the political life of Egypt was concentrated in the maritime nomes. The nomes of the Thebaïd, ruined by Ethiopian and Assyrian invasions, lost their influence; Thebes fell into decay and ceased to possess any interest, except for the tourist and sight-seer.

"I propose, therefore, to divide the history of Egypt into three periods, each corresponding to the political preëminence of a city, or of a division:

"1. *Memphite Period* (first to tenth dynasties).— Supremacy of Memphis and of the Memphite kings.

"2. *Theban Period* (eleventh to twentieth dynasties). — Supremacy of Thebes and of the Theban kings.

"This period is divided into two parts by the invasion of the Hyksos:

"*a.* Ancient Theban Empire (eleventh to sixteenth dynasties).

"*b.* New Theban Empire (sixteenth to twentieth dynasties).

"3. *Saite Period* (twenty-first to thirtieth dynasties).— Supremacy of Saïs and other cities of the Delta.

"This period is divided into two parts by the Persian invasion:

"*a.* First Saïte Period (twenty-first to twenty-sixth dynasties).

"*b.* Second Saïte Period (twenty-seventh to thirtieth dynasties)."

It was under the New Theban Empire that Egypt reached the zenith of its power, during the eighteenth and nineteenth dynasties. Thothmes III, who lived in the seventeenth century B. C., had extended his dominion over Abyssinia, the Soudan and Nubia, in Africa; and over Syria, Mesopotamia, Irak Arabi, Kurdistan and Armenia, in Asia. During the fifteenth century Rameses II flourished, the Sesostris of the Greeks, a name celebrated throughout all the ancient world.

From this period incessant conflicts were carried on against the Asiatic nations, and notably against the Assyrians; but they were not always successful, and the Egyptian Empire lost in power.

It was not until the seventh century that the Greeks penetrated into Egypt, and, opening relations with its inhabitants, were able to drink at the springs of this ancient civilization. In the sixth century, the invasion of Cambyses brought Egypt under Persian domination, which, in spite of several revolts, was maintained until the fourth century, when Alexander appeared (332 B. C.) and subjugated the entire realm without a struggle. The city of Alexandria dates from his passage.

Ptolemy founded the Greek dynasty of the Lagides. A short time before the Christian era Egypt became a Roman province, passing into the Eastern Empire at the time of the great division of the Roman world. In the seventh century A. D. the Persians once more took possession of the country, but yielded promptly to an Arab invasion (638 A. D.). A flourishing Greco-Roman period had already succeeded to the ancient Egyptian civilization, and now Egypt witnessed the flowering out of Arab art.

Our present study will be confined to the edifices constructed under the ancient Egyptian dynasties; the temples reared

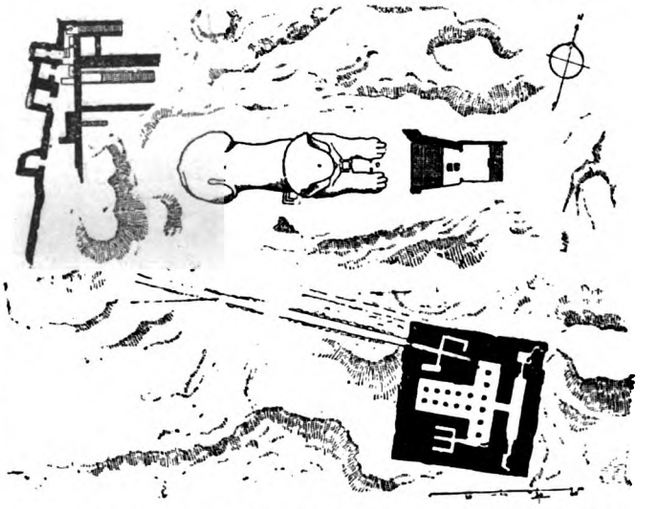

Fig. 1. Plan of the Temple of Gizeh (about 2000 B. C.). After Mariette and M. Rhoné.

later were Greek or Roman, and did not in reality spring from the original soil of Egypt.

The first men, said Lucian,[3] who, to our knowledge, had any notion of the gods, were the Egyptians; they dedicated temples, enclosures and solemn assemblies to them. They were also

[1] From the French of P. Planat, in Planat's "*Encyclopédie de l'Architecture et de la Construction.*" Continued from page 21, No. 746.

[2] Maspéro. "*Histoire Ancienne des Peuples de l'Orient.*"

[3] "*De Dea Syria.*" Attributed to Lucian.

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the first to fix upon consecrated expressions and formulas. A little later, the Assyrians, having adopted the Egyptian beliefs regarding the gods, established forms of worship and built edifices, wherein they placed statues and sculptured images. In the beginning, the Egyptian temples were destitute of all such ornamentation.

It is supposed that one of these ancient structures (Figure 1), has been discovered at Gizeh, a short distance from the Sphinx; if this is the case, it is the earliest vestige of religious architecture, being contemporary with the fourth dynasty, and dating back for several thousand years. The entrance is indicated at the left of the temple, facing a path, traces of which are still visible, and which extended beyond the Great Sphinx; this opening, which is scarcely six feet broad and not in any axis, looks as though there was an effort to conceal the temple from view. On the right of the corridor of access, itself very narrow, there was a room, and at the left a stairway leading up to the terrace. The large, transverse hall to which the passage conducted was covered by a ceiling supported on six stout pillars, about sixteen feet high; these were connected by equally massive architraves. The great hall with three bays, perpendicular to the first, was constructed in the same manner. Another transverse room, in the rear, contained a well which must have extended below the Nile at its highest floods. Granite was used for the supports and alabaster for the architraves, with no mouldings or decorations of any sort.

According to Mariette,[1] this structure may have been a tomb; but there are quite convincing reasons for admitting that it is, indeed, an example of one of those unadorned, primitive temples, the traditions of which had been maintained down to the time of Lucian, or of the author of the passage cited above. The small temples near the great pyramids belong to the same epoch; Jomard, at the time of the Egpytian expedition, gave a more complete description of these than the condition of their ruins would permit to-day. "The monument[2] situated at the east of the third pyramid is a most extraordinary construction in plan and proportions, and in the great size of the building material used. In shape it is nearly square, being 152¾ feet x 184¾ feet. On the east there is an extension like a long vestibule, 101⅜ feet in length and 46½ feet in breadth. From this vestibule a vast court was entered, which had two side-exits, or false doors. Beyond were several spacious halls, one of which still exists. The rear hall is of the same width as the vestibule, and tallies exactly with the centre of the pyramid, from which it is only 42 or 43 feet distant; but their length varies from 10 to 20 feet. Their proportions are such that I took them at first for cuttings in the natural rock, and one would certainly be deceived as to their true character, were it not for the cement between the courses.

"The eastern extension is formed by two enormous walls, not less than 13⅜ feet deep. One wonders what necessitated such extraordinary constructions, when they would have been just as solid with only half that thickness."

Almost nothing remains of the edifices of the Middle Empire; a few polygonal columns[3] mark the site of the Temple of Ammon at Thebes, which was erected under the twelfth dynasty. At Semneh, in Nubia, there is a temple which originally belonged to the same epoch, but which was afterward completely rebuilt.

On reaching the New Empire, a still venerably ancient period, we find, on the contrary, a vast quantity of remains sufficiently well-preserved to admit easily of complete restoration.

"Care must be taken," says Mariette, "not to confound the character of the Egyptian temple with that of the Greek temple, or the Christian church, or the Moslem mosque. The Egyptian temple was not a place where the faithful assembled for common prayer; no public worship was celebrated there; it was inaccessible save to the Pharaoh and the priests. The temple was a royal 'divine-house,' that is to say, a monument of the king's piety, reared to merit the favor of the gods. It was a sort of kingly oratory, and nothing more." The decorations consisted of a series of paintings representing the monarch as making offerings to the deity and begging that some favor be accorded him; in reply the god grants the request.

Fig. 3. Longitudinal Section of the Temple of Khonsu (15th Century B. C.).

The approach to the temple was through a long, broad avenue, or *dromos*, bordered with sphinxes or rams; sometimes there were several avenues leading to different entrance-gates. These latter were pierced in the wall or walls of unbaked brick, which were of a considerable thickness and surrounded the temple on all sides.

The entrances were all invariably flanked by pylons; these stupendous truncated pyramids were decorated with masts from which floated streamers, and which were held in place in the upper part by a projecting wooden framework. The pylons at

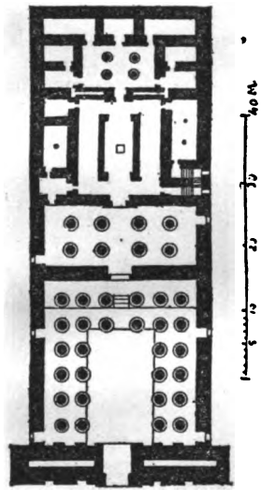

Fig. 2. Plan of the Temple of Khonsu.

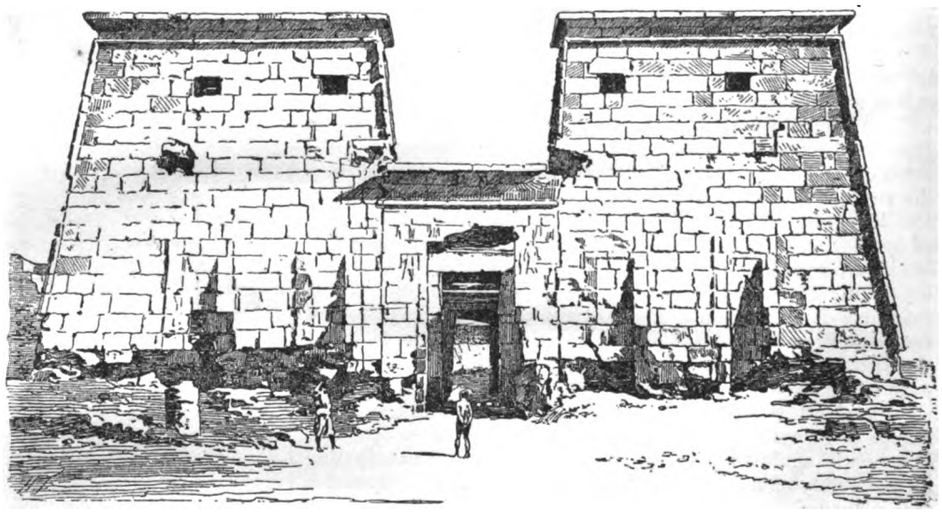

Fig. 4. Entrance to the Temple of Khonsu.

I found no opening at the corresponding point. However that may be, the disposition and symmetry are such as to prove that a relationship must have existed between this structure and the pyramid.

"Though one has studied the constructional system and the building material of the edifices in the Thebaïd, he is, nevertheless, astonished at the huge size of the blocks employed here, and at the care exercised in laying them. The walls are 7¾ feet thick; that is the breadth of the stones; the main entrance-gate were preceded by obelisks, and backed against the pylons were colossal statues.

There were vast reservoirs in the interior which were used for ablutions and in religious festivals; they were of sufficient size to float a large number of boats. In the descriptions which Herodotus gives of the temples which he had seen, he is constantly referring to these lakes and to the ceremonies connected with them. "At Saïs," he says, "the enclosure contains stone obelisks and, close by, a round sheet of water surrounded by a stone border, as large, it seems to me, as the

[1] *Question relative aux nouvelles fouilles.*
[2] "*Description de l'Egypte.*"
[3] Sixteen-sided, like the channelled Greek columns.

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reservoir at Delos called the circular lake." Describing the temple of Bubastis, he says: "Except for the entrance, it is an island, for two streams from the river, without uniting, run as far as this entrance, and then flow around the temple, one on the right, the other on the left; they are 100 feet in breadth and are shaded by trees. The porches are ten orguia in height (we recognize in these the pylons); they are adorned with figures six cubits high, and of remarkable beauty. . . . A wall on which images are engraven, encircles the temple. Within there is a sacred wood of tall trees planted about the vessel where the statue of the god is placed. The structure taken as a whole is square, measuring a stadium on each side. A road of stones, at least three stadia in length, extends to the entrance." This path is the *dromos* noticed above.

Many of the Egyptian temples consist of an agglomeration of structures built at different periods, and it would be a difficult matter to discover their original plan. As MM. Perrot and Chipiez have remarked,[1] it is in the temple of Khonsu alone (Figures 2, 3, 4), situated not far from the Great Temple of Karnak, in the neighborhood of Thebes, that we can learn what were the requisite elements of a simple temple, free from all later additions. The pylon entrance gives access to a huge walled court, with double rows of columns in the interior. In the axis is a second door opening into a vast hypostyle hall which runs in a transverse direction and is called the *assembly hall*. Beyond this begins the sanctuary or *secos*, where only the king and priests of highest rank had a right to enter, and which contained the emblem symbolizing the god. We learn from Herodotus[2] that this image, which was kept in a sort of gilded wooden ark or tabernacle, was carried about only during great ceremonies. Priests were appointed to drag the four wheeled chariot on which the ark was borne. This tradition, as we know, obtained also among the Hebrews.

The main part of the sanctuary or *secos*, consisted of a rectangular chamber, isolated by a passage from the rest of the edifice. Two small rooms occupied the sides. Behind, there was another hall, a sort of *opisthodomus*, which doubtless served as a treasury, in Greek temples.

A noticeable peculiarity in these temples is the steady decrease in height from the lofty front structures toward the rear. The back halls near the *opisthodomus* are low and squat. This is remarked on every longitudinal section, like that of the temple of Khonsu (Figure 3). The entrance court, which was open above in the centre, was freely lighted; the hypostyle hall, pervaded by a sober twilight, prepared for meditation; while the sanctuary was all obscurity and mystery. Sometimes, however, owing to the purposes for which it was designed, a great elevation was allowed to the hypostyle hall.

The public had access by numerous stairways to the terraces of the temple, whence they could take in the ceremonies as a whole.

The great temple of Karnak (Figures 5, 6, 7) was consecrated to Ammon Ra; it was apparently built under the twenty-second dynasty. The same unity of plan is not exhibited here as in the temple of Khonsu, but it is easy to discern the successive additions. In the entrance court we discover first, on the left, the remains of a small older edifice, built by Rameses III, and on the right the temple of Seti breaking into the side of the enclosure. A double range of columns leads to the second pylon which gives access to the vast hypostyle hall, the largest of all such halls constructed by the Egyptians.

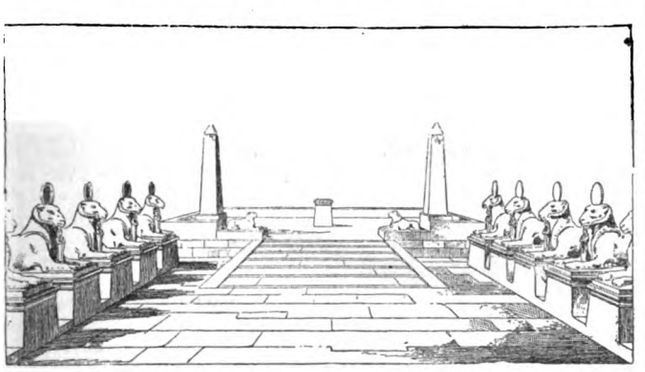

Fig. 5. Dromos of the Great Temple, Karnak (15th Century B. C). After Prisse.

An uncovered passageway leads to the sanctuary, which is here completely isolated and entirely surrounded by walls. Other, but much less important, hypostyle halls prepare the special way to what was undoubtedly the Holy of Holies, that is, to the small rectangular room situated in the axis, between the pavilions enclosing the lateral chambers. Mariette, it is true, found a little farther on, in the centre of the court, the débris of a veritable Holy of Holies, but it belongs to a much more ancient period, and probably had been preserved, out of veneration, by the side of the new sanctuary-chamber.

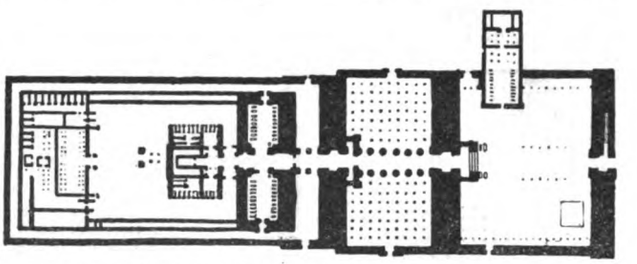

Fig. 6. Plan of the Great Temple, Karnak. After M. Brune.

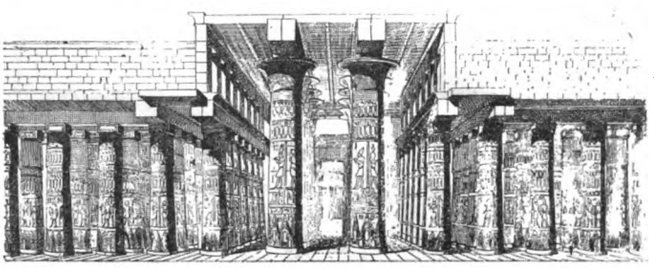

Fig. 7. Section of the Great Temple, Karnak. After Chipiez.

At Luxor (Figures 8, 9, 10), which dates from Rameses II, it is likewise easy to recognize in the rear of the edifice the sanctuary-chamber in its ordinary form, that is, rectangular with openings in the axis, one in the front, the other in the rear. The *opisthodomus* and the lateral chambers are distinctly indicated. The hypostyle hall preceding the sanctuary and running transversely to the general axis of the temple, is distinguished at once. But the *pronaos* is in reality double; the outer one of these fore-courts presents a very peculiar form of an oblique parallelogram. It seems evident that it must

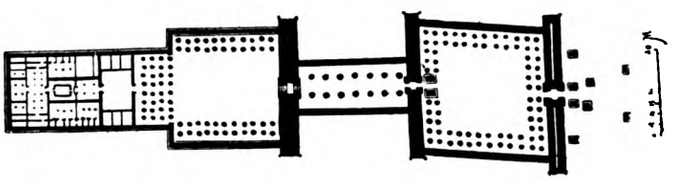

Fig. 8. Plan of the Temple of Luxor (15th Century B. C).

Fig. 9. Section of the Temple of Luxor. After Chipiez.

Fig. 10. The Temple of Luxor.

[1] "*L'Egypte, Histoire de l'art dans l'antiquité.*"
[2] "*Euterpe,*" LXIII.

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have been merely an additional portico, followed by a longitudinal gallery constituting a sort of Propylæa.

Rameses also erected the *Ramesseum* (Figure 11), which was apparently a chapel attached to his tomb. The general dispositions recall those already noted, namely, a fore-court, as at Luxor, with a double colonnade on the sides, preceding a second court surrounded by colonnades; the hypostyle hall, with a row of heavier, taller columns down the axis leads to the sanctuary. Among the halls comprised in the sanctuary, it is difficult to discover the special form of the Holy of Holies; this may be owing to the peculiar destination of the structure.

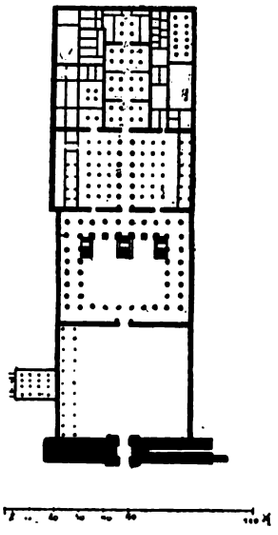

Fig. 11. Plan of the Ramesseum (15th Century B. C.). After Lepsius.

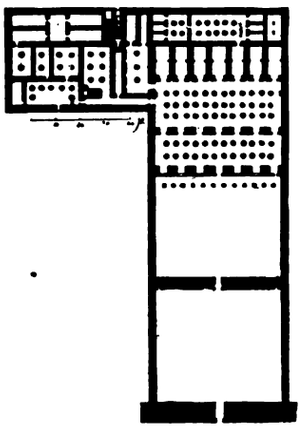

Fig. 12. Plan of the Temple of Abydos (16th to 15th Centuries B. C.). After Mariette.

At Medinet Haboo, a little farther on, we encounter, in a group of edifices, a second *Ramesseum* or great temple, and the temple of Thothmes, dating from the reign of Rameses III. The temple of Thothmes is of extreme simplicity, and not without likeness to the temple of Khonsu; the great temple was evidently a faithful reproduction of the first *Ramesseum*.

In the temple of Abydos, constructed by Seti I and Rameses II, the usual arrangement seems, at first sight, to have been abandoned (Figure 12). Except, however, for a few minor modifications, the ordinary design is preserved. As at Medinet Haboo and in the *Ramesseum* at Thebes, the sanctuary is reached through two courts; they are destitute of peristyle, but the second court has a transverse row of columns in the rear. The hypostyle hall is double and devoid of the higher bay in the axis, which we have had occasion to remark. The sanctuary chambers in the rear are recognizable by their form, but they are seven in number, as the temple was, quite exceptionally, dedicated to seven gods — Horus, Isis, Osiris, Ammon, Harmakhis, Phtah, and Seti himself, assimilated to the great divinities. As for the *opisthodomus*, it is wholly relegated to the side.

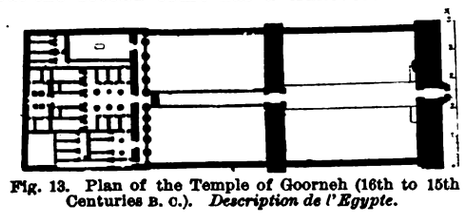

Fig. 13. Plan of the Temple of Goorneh (16th to 15th Centuries B. C.). *Description de l'Egypte.*

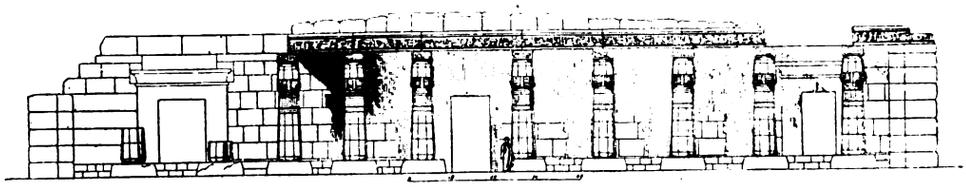

Fig. 14. Section of the Temple of Goorneh (16th to 15th Centuries B. C.). *Description de l'Egypte.*

The temple of Goorneh (Figures 13, 14), except for the position of the *opisthodomus*, is a variant of the temple of Abydos; it was, moreover, built by the same sovereigns.

[To be continued.]

THE PROPOSED WORLD'S FAIR BUILDING. — PORTICOS ON CITY STREETS. — A FIRE WALL. — THE CARPENTERS' AND PLUMBERS' STRIKE. — THE ART INSTITUTE EXHIBITION.

THE World's Fair business is being carried on with energy. Our definite plan for a building has been submitted to the public and the public is duly filled with amazement. This amazement is fast changing into a certain kind of admiration, if not for the practicality of the plan, at least for its entire originality.

The creation is one of Mr. Jennison's and his scheme is to create for the World's Fair a colossal building under one roof. Inspired by the thought apparently that America should outdo France in the wonder of her Eiffel tower, Mr. Jennison has conceived the idea of erecting a huge tent-like structure. This building is to be three thousand feet in diameter, that is, it will cover a square space of seven of our ordinary city blocks in an easterly and westerly direction, and seven in a northerly and southerly one. It is, as stated above, to be built on the plan of a tent, with a central pole, the pole being a tower, which will rise over one thousand feet, and on which will be an observatory, from which, if Mr. Jennison's entire plan was to be carried out, one would be able to see the opposite Michigan shore, across the Lake. Chicago people realize a little the height of this observatory, when told that it will be four times as high as the highest tower in the city, that of the Board of Trade Building, lifting aloft its gilded ship. The architect's choice would be to erect the building on the Lake Park Front, and as the extent of this is somewhat limited, he proposes to utilize the outer harbor, which is protected by the government breakwater, driving piles to carry the foundations of the building. Situated here he would have a canal two hundred feet wide, that would make the circuit of the building, so as to give an opportunity for a marine exhibit, and vessels coming direct from foreign countries could be brought right into the building. The idea would be to arrange the different nations on radial lines and the classes of exhibit on concentric ones. In this way one could study a particular nation by continuing on a radial line or a class by following a circle. The some class of objects as treated by different nations could in this way be most interestingly compared. The entrances lead into the first gallery, which is seventy-five-feet wide, making a promenade which can be filled up with cafés and booths. In the second gallery are the horses, and a race-course, a mile and three-quarters long, is obtained as an incidental attraction. Leading from the galleries there would be forty-eight flights of stairs. The idea is to have six tracks under the gallery around the outer edge of the building for the railway exhibits. Next would come the heavy machinery, then the light and then the canal. In the centre of the building will be a huge amphitheatre which will hold fifty thousand people, if so great a number can be found who are fools enough to go in and take the chances of getting out.

This building is guaranteed to be perfectly cool at all times, so says Mr. Jennison, as the roof will be five hundred feet above the heads of the public, and he has an additional proposition, to pump water up into the tower and by sprinkling the roof, would have two hundred acres of evaporating space. The question, however, as to how cool the building would actually be, could only be settled on some of those hot July and August days that even Chicago, that much vaunted "summer resort," is capable of getting up. A room looks cooler on paper in April, than it actually is in August, filled with hundreds of perspiring humanity.

The roof will be corrugated iron and glass, unless canvas is used in part.

The exterior of the great building, covering three times the space of any exposition ever held, will be of brick. The outer wall will be three stories, two of the stories being galleries.

Mr. Jennison says that the expense of the building will be less than the expense of the collective buildings of other expositions, and in his sum total will be included the expense of removing the piles from the Lake after the fair is closed.

According to the architect many of the leading engineers of the country have pronounced the plan practicable and what at first appeared only as something "new, novel and bad" is beginning to look as if it were more worthy of the first two adjectives than the last. It, at least, would have the virtue of being most truly and characteristically American, and to foreigners the proverbial American brag of big, bigger, biggest, would be more than realized by this mammoth structure. Much would, of course, be lost in the architectural features of

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the exhibit, which might be most attractive if well-handled, and it seems a grave question, whether it would be wise to try such a huge experiment in the way of an exposition building. Of course, the objections to having the fair held in the centre of the city, as far as the uncomfortable crowding of the surrounding streets is concerned, would hold true of this building as well as any other. The very least that can be said of this plan is that it is most ingenious and original, and deserving of notice and consideration.

Apropos of the convenience or inconvenience of "doing" the World's Fair under one protecting roof, one naturally thinks of those children of Bellamy's, who in wet weather were to go dry-shod and dry-capped from one end of the town to the the other. It at one time looked as if Chicago would in this small but attractive feature soon reach the ideal state of the nationalists, so numerous had become the porticos, or, as they are popularly called, permanent awnings. The permit for them heretofore has been obtained by inducing some alderman, as a special favor to a pet constituent, to move the passage of an order for their erection. Now Fire Marshal Sweeney and the Commissioner of Public Works declare they must go. The fire chief insists that they are a positively dangerous impediment in case of fire, the commissioner sympathizes with the marshal and calls them unsightly and a nuisance on crowded streets. Let us devoutly pray that a similar fate is not waiting for Mr. Bellamy's other theories, when the nationalists put them to the test, in more or less directly following the words of the gentleman in the Rubaiyat, by "grasping this sorry scheme of things entire and shattering it to bits to remold it nearer to their hearts desire."

Mr. Sweeney may not appreciate a "Looking Backward" portico, but he knows a good fire wall when he sees it and such he pronounces that of J. V. Farwell, which has recently been put to the test. When Mr. Farwell built the large structure on Market and Adams Streets, in which millions of dollars' worth of business is yearly carried on, he desired to protect the property in the building from fire, which if once started might spread over the entire edifice. He accordingly built the wall between each of the nine stores, which has been so successful in the recent fire. It consists of a twelve-inch brick wall, lined on each side with a two-inch layer of concrete. The concrete veneering was applied by a case of boards being first built two inches from the brick, and the space filled with concrete, and the boards knocked away again after the cement had hardened. Chief Sweeney reports that this wall probably saved the building, the concrete, offering a much greater resistance to heat than brick, in this case preserving the wall proper and adjoining buildings intact.

The spring campaign has been opened and six thousand carpenters are now on a strike, which by the time of the publication of this letter will either be on or off, which will make the facts interesting reading for the subscribers of the *American Architect*. The plumbers have also been on a strike, which has been just settled by the journeymen receiving three dollars and fifty cents for an eight-hour day, and the "Junior" an advance of twenty-five cents on their former wages. It was furthermore decided that all future differences between journeymen and masters should be settled by arbitration.

As mentioned in the last letter, the Art Institute has opened its remodelled building. What was said of it at first still remains true. The exterior is pleasing, though the addition is not entirely in harmony with the older portion, and the interior is a sad botch, that all the remodelling in the world can but little improve. With the exception of the six fine new galleries at the top of the building, the interior is, if anything, still more intricate and unsatisfactory than before, and that a building that might have been so good, should have a plan of so decidedly a made-over and make-shift a character, is much to be regretted.

Just at present the Chicago Society of Artists, representing the leading young artists among the men, and the Palette Club, numbering among its members many of the women artists of the city, are holding exhibitions side by side. This gives an opportunity for interesting comparison. The Palette Club, unlike the Chicago Society of Artists, numbers among its members many amateurs, but in spite of this fact, which might naturally lower the grade of work, it stands the test of comparison very well.

It is much to be regretted, for the sake of the growth of art in Chicago that our most successful young artists find the attractions of New York's artistic circle so strong. This is, however, not to be wondered at, though the rapid strides which art has taken in Chicago during the last ten years, lead us to hope for better things in the future.

REPAIRS TO SEVILLE CATHEDRAL. — It will be remembered that two years ago the condition of Seville Cathedral, that beautiful monument of Moorish art, once a mosque, excited great anxiety. A pillar and part of an arch in the nave fell, and fears were entertained that the whole building might suddenly collapse. It is now believed that by massive substructions the danger of further mischief has been averted. The fallen pillar and arch are being replaced, and other extensive repairs and restorations are being carried out. Especially the celebrated entrance known as the Portal San Cristobul, which was never finished, is being now renovated and completed. Architects will recall the fact that the present pillars of the nave and aisles of the basilica of St. John Lateran, in Rome, are massive columns of masonry built up around the original much slighter pillars, some of which gave signs of collapsing. — *London Times.*

CANADA

THE BILL FOR THE REGISTRATION OF ARCHITECTS. — A STRIKE IN THE BUILDING TRADES IN TORONTO. — THE TORONTO BOARD OF TRADE BUILDING. — GIFTS TO THE McGILL AND TORONTO UNIVERSITIES. — QUEBEC AND MONTREAL ARCHITECTS. — THE QUEBEC CITY-HALL COMPETITION.

THE Ontario Association of Architects are to be congratulated on the fact that they have obtained legislation. Their bill has been passed and has received the assent of the Lieutenant-Governor of the Province. Whether the bill as passed is all that they desired or all they could hope for, I am unable to state at present for I have not been able to obtain a copy and I understand that some considerable alterations were made, but at any rate it is something to have got the bill passed in some form or other. Acts of Parliament are, perhaps, easier to amend than to obtain, but having been obtained one great object of the Association, namely, its recognition as an authorized body is guaranteed. But I must leave till next month further remarks upon the bill.

A strike of stone-masons, stone-cutters, bricklayers and laborers, began in Toronto last week. An agreement between the Masters' Association and the Workman's Union, which has been in force for the last two or three years has recently run out and the men are striking for increased wages and shorter hours, or in other words, the same pay for fewer hours' work. Nothing could be more preposterous than the demands of the masons. They have been receiving thirty-two and one-half cents an hour and they asked forty cents. They were promptly told that if they did not keep to the existing agreement, the masters would go back to the old rates and pay them twenty-five cents an hour and no more. This made them drop five cents in their demand and now they are out on a demand of thirty-five cents an hour. Stone-cutters demand a rise of seven cents, from thirty-eight cents to forty-five cents an hour. The bricklayers appear to have a cerebral formation a shade better in quality than the masons and are content with a demand of thirty-six cents an hour, a rise of two and one-half cents. They have been willing to submit their case to arbitration, but as the masters would not agree, they are out also. The laborers want two cents an hour more than they have been getting, twenty-one cents instead of nineteen cents. While on strike, the masons and bricklayers are allowed by their unions, seven dollars a week for married men and five dollars a week for single. This, perhaps, is not a bad illustration of the value a workingman puts upon his better-half and the children. I have known many cases, in which a workman in receipt of good wages would give his wife one-fourth part to pay the rent, clothe and feed himself and family, while he spent the remaining three-fourths on his own pleasures, but here is a further illustration, five dollars for the man and two dollars for the wife and children.

The citizens of Toronto are in a state of subdued uneasiness with respect to the building now being erected for the Board of Trade. From time to time rumors have been afloat that it is very insecure and the *Mail*, the principal Canadian paper, has had articles inquiring what is the meaning of the report. There has been a good deal of secrecy about the building committee, who appear to think that the matter is a personal one, forgetting that the Board of Trade is a public body and that the whole city is interested in its proceedings and that a large number being members are personally so. The fall of three stories of brickwork by the failure of an iron girder supposed to be sufficient for their support, gave some sort of apparent foundation for these unpleasant rumors and when it was found that the committee were trying to hush the matter up and would give no satisfaction to inquiries, people began asking what it meant? Reporters were told that experts had examined the building and that it was quite sound and secure and that although extra supports were being put into the foundations, they "were merely precautionary and not at all necessary." One thing is, however, very clear, that at last even the self-satisfied committee are beginning to be a little anxious. They have appointed three Toronto architects to examine the building and make a very careful report of its stability. The labors of these examiners are said to have come to an end within the last four-and-twenty hours and their report is anxiously looked for, though the whole matter is supposed to be "secret and unknown." The contractor who commenced the works and has, it is said, carefully carried out his instructions, has been dismissed and another contractor appointed to finish the work. At this, of course, the Master Builder's Association have demanded the wherefore, so that it is extremely foolish of the committee to try to keep matters "*sub rosa*." The Canadian law makes the architect and the contractor together responsible for the stability of the building for the period of ten years and should the building tumble down even if the contractor can prove he worked according to the architect's instructions, this responsibility is not lessened, as the law considers him capable of knowing what it was safe to execute and what he ought to have refused.

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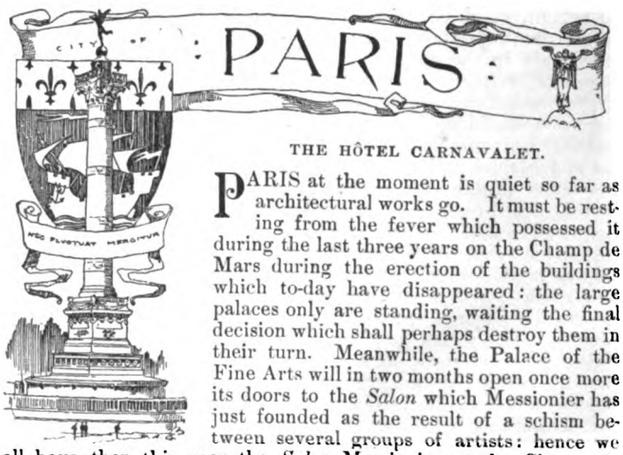
The Toronto "*Mail*" had on article on April 5, from which the following is extracted: "It may be fairly held, therefore, that the few members of the Board of Trade, who act as if the question with regard to their new building had nothing to do with the general public and is a matter concerning the Board of Trade and their architects [Messrs. James & James] and their builder [Mr. Pudifer] only, have not duly considered the circumstances. Whether correctly or not, an impression is abroad that the new building at the corner of Yonge and Front Streets is in some degree unsafe. Nothing, perhaps, could have more stimulated the growth of this notion than the evident anxiety on the part of its owners, to envelope the place in mystery and to shroud it from the public gaze. . . . It is one thing to produce a 'taking' pictorial representation of an edifice, but it is quite another to be able to translate it into ponderous stone and weighty iron. . . . No doubt the Board of Trade Building can be strengthened and braced into stability by the judicious use of iron and materials. The city has a right to ask that this shall be done in such a manner as to ensure its safety."

The McGill University of Montreal has been in luck's way lately. It is only a short time ago since it received a gift from the late Mr. Thomas Workman of $125,000, and to-day it is in possession of another generous present of $150,000, from Mr. W. C. McDonald, another of the city's wealthy merchants. Two new buildings will be commenced with as little delay as possible, that every advantage may be taken of the valuable and substantial aid the university has thus received. The "Workman Workshops Building" (not a euphonious title, however) is to face the new "McDonald Technical Building" and the McDonald Physics Building will be placed in a position near the Redpath Museum. Certainly the educational institutions of this country have not been wanting in the matter of friends as the names of the many various buildings in connection with their establishments plainly show. There can be very little doubt that had there been a conservative administration in the Province of Ontario, the Toronto University would have had less begging and borrowing work to do, before it could be re-established. The $160,000 from the government is to be granted immediately and possibly the grant from the city of $50,000 may be augmented, if the University authorities can be made to give the city some benefit in return, in the way of land for parks and so on. But the present government is getting into such deep water with its own white elephant, the Parliament Buildings, that naturally it is not very sympathetic with other people who have building troubles.

The architects of the Province of Quebec are talking about the formation of a Provincial Association and seeking legislation on the lines of the association of Ontario. A meeting for this purpose was said to be announced to be held in Montreal, but nothing seems to have come of it, and indeed what else could one expect when for the last twenty years attempts have been made to draw the architects there together, but all have failed. The jealousies of Montreal's architects are positively ridiculous. Beginning with the natural dislike that usually exists between "two of a trade" this feeling is stimulated into an antipathy in the hearts of the one race against the other, and the English speaking and the French are separated by a wide gulf. This natural racial dislike, culminates in a general hatred of every individual in the profession and so the formation of an association among such very unethical men is an impossibility. The Quebec Association, however, very kindly wishes to embrace all the Montreal architects, but they have stayed proceedings until the Ontario architects' bill should have been passed or thrown out, in order to see what chances they were likely to have of success. Perhaps if the Montreal men get some kind friend to take them by the hand, they may be induced to embrace each other.

The "*Canadian Architect*" for the last month, contains a letter from the city engineer of Quebec, in reference to the remarks of that journal about the advertised competition for the new City-Hall. The conditions are of a very unhealthy character and the accommodation required is so great that the journal remarked it could not be carried out for the money. The city engineer is apparently hurt by the fact that, as he says, "the committee either thought it beneath their dignity to consult him, in the premises, or that knowing that public buildings cost twice as much as the original estimates, they thought that by limiting architects to $200,000, they could get a building finished for about $400,000, and so the truth as to their real intentions leaks out." "When —— fall out wise men get their due," but in this case the wise men will refrain from attempting to get their due or anything else.

The Pont du Diable. — Another popular tradition has been exploded in the discovery of the precise origin and exact date of the construction of the famous "Pont du Diable" in which is now the department of the Pyrénées Orientales, but was formerly the province of Roussillon. The popular legend about this bridge, which spans a mountain torrent called the Tech, near the small town of Céret, was that it had been built during one night by Satan and his myrmidons, and the fact that the particulars as to its construction had never been found in any of the local archives of course gave additional strength to this legend. But the registrar of a neighboring town called Prats de Mollo, close to the Spanish frontier, has just unearthed a manuscript, dated 1321, which relates how the notables of that town "contributed ten golden crowns of Barcelona towards the building of the bridge at Céret upon condition that the inhabitants of Prats de Mollo were exempted from paying toll." The toll-gate has long since been done away with, and this no doubt was how all trace as to the origin of the "Devil's Bridge" was lost. — *Building World.*



THE HÔTEL CARNAVALET.

PARIS at the moment is quiet so far as architectural works go. It must be resting from the fever which possessed it during the last three years on the Champ de Mars during the erection of the buildings which to-day have disappeared: the large palaces only are standing, waiting the final decision which shall perhaps destroy them in their turn. Meanwhile, the Palace of the Fine Arts will in two months open once more its doors to the *Salon* which Messionier has just founded as the result of a schism between several groups of artists: hence we shall have then this year the *Salon* Messionier at the Champ de Mars and the *Salon* Bouguereau in the Champs Elysées.

To-day we will visit the Hôtel Carnavalet, which, finding that its riches were increasing, the authorities have been obliged to enlarge. In her letters Madame de Sevigné allows us to perceive the joy she felt nearly two hundred years ago, in establishing herself in a hôtel which thoroughly pleased her, and which she was going to inhabit with her daughter and the Abbé Coulanges, her uncle, in a rich and elegant quarter. This hôtel had been built in 1544 by Jean Bullant, after the designs of Pierre Lescot, for the president of the Parliament, Jacques de Ligneris, Seigneur de Crosnes. About 1578 it was purchased by Françoise de la Baume, widow of the Baron de Kernevenog, who discharged the duties of governor to the Duke of Anjou, later Henry III, whose name was finally corrupted into Carnavalet. This name fixed itself upon the Hôtel of Madame de Sevigné — "La Carnavalette," as she called it, situated at the corner of Rues Sevigné and Francs-Bourgeois. But this quarter of the Temple has since that time lost its aristocratic air, which, nevertheless, is still found on some few houses whose porte-cochères, formerly allowing entrance to the chariots and carriages of marquises of the utmost fashion, to-day open for the wagons of the merchants and workmen whose sign-boards have taken the place of the sculptured coats-of-arms of former days. This corner of Paris, foul and pestiferous with odor of grease and frying-pan, shelters a great number of charming details dating from the Renaissance and Louis XIV, unfortunately too often degraded by the practical men of business who have hardly time to spare a thought for the destruction of the artistic things of whose real charm and value they are ignorant. Have they ever looked at the sculptures which decorate their doors, the figures finely carved in medallions, ornamented with flowers and made gay with chubby-cheeked Cupids, whose smiles, which have endured for two centuries, reward the one who discovers them and disinters them from their covering of dust and oblivion. In the Rues Vieille-du-Temple, des Francs-Bourgeois, Ste. Croix de la Bretonnerie, etc., there are only pretty pediments and consoles artistically modelled, masks grimacing still at the outrages of the weather, cupboards, rococo work and wreaths peeling off, but allowing still to hang in the middle of these ruins of old age, a stem or a crisp little flower, evidence of the elegance and youth of former days.

The Hôtel Carnavalet has happily escaped in part the tooth of time and the vandalism of man. Its walls carefully guard the souvenirs of two historic names, those of Goujon and Madame de Sevigné, and of two grand epochs, that of the Renaissance and the age of Louis XIV. It was Jean Goujon who was charged with the decoration of this edifice by Jean Bullant.

At the commencement of the seventeenth century the new proprietor, M. D'Argouges, carried out certain interior decorations by Androuet de Cerceau, and later, in 1660, M. D'Agaurry, councillor in the Parliament at Grenoble, to whom the hôtel belonged, employed François Mansard to enlarge it. In his restoration this artist gave to this building the character of his own age and the aspect which it to-day presents. The plans of Pierre Lescot conformed to the *parti* generally adopted in private hôtels of the fourteenth and fifteenth centuries, which consisted of an entrance, which gave access to the interior court-yard surrounded by inhabited rooms, at first only one room deep. Later architects gave a greater depth to their buildings in such a way as to arrange two ranges of rooms between the exterior walls.

The entrance doorway of the Hôtel Carnavalet, the work of Bullant and Jean Goujon, was preserved by Pierre Mansard in his new façade — a full-centred bay, surrounded with vermiculated lozenge-work and decorated on the central keystone of the archivolt with an admirable winged figure by Jean Goujon, representing Abundance. It formerly stood upon a globe, which was afterwards transformed into a mask in allusion to the name Carnaval[et], a logical transformation since certain philosophers consider the world merely a masquerade. In the tympanum of the doorway two little genii bearing palms lean upon an escutcheon which formerly bore a coat-of-arms. At right and left two bas-reliefs representing tame lions surrounded by trophies were anciently placed above two little side doors which flanked the entrance into the interior court-yard.

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Other sculptures adorn the piers of the first story of the façade, the work of Van Obstal, and represent in a very mediocre fashion Vigilance and Firmness. The pediment was crowned with a statue of Minerva standing, and beneath on the stylobate is engraved the restoration of the hôtel and this façade in 1661. Van Obstal is also the author of the bas-relief on the façade upon the Rue Francs-Bourgeois — Wisdom and Love bringing back peace and abundance. This allegorical subject is an allusion to the marriage of the king and to the Treaty of the Pyrenees, which took place at the time when Mansard was carrying on the restoration of the Hôtel Carnavalet. In the interior court-yard the main building which fronts the entrance is decorated with four large bas-reliefs attributed to Jean Goujon. These figures, which represent the Seasons, lack the elegance and fineness which are usually found in the work of this master, so it is allowable to believe that even if these sculptures were made under his direction they should not perhaps be attributed absolutely to him. As to the very mediocre bas-reliefs on the two wings, these are by Van Obstal. On the right four goddesses, Juno, Hebe, Diana and Flora, surmounted with the symbols of the four Winds; on the left the Elements, which, in the shape of male figures, represent Air and Water. All these are without grace and without worth: but in the windows of the lower story grin admirable masks of satyrs by Ponce, and above the doorway of the grand staircase, which is situated in the angle on the left, couchant genii holding lighted torches bear witness to the gracious talent of Jean Goujon, whose superiority is emphasized in a startling way by the contrast

The Hotel Carnavalet.

which is offered by the modern bas-relief vis-a-vis to it, which is a gross imitation of the same subject.

The artist again reveals himself with greater grandeur in the figures sculptured on the interior pediment of the doorway. The keystone is a little chef-d'œuvre, and represents Authority standing on a globe, holding a yoke and commander's baton. On each side a couchant Fame holds branches of laurel and palm. Madame de Sevigné lived in the Hôtel Carnavalet almost twenty years, from 1677 to 1696, as witnesses the inscription on the Rue Francs-Bourgeois. She occupied the part of the building situated at the back of the court-yard, where are now the rooms devoted to the library. The only room which has been preserved intact is the *salon* with its fine carved wainscot, to which has been assigned the collection of engravings. The right wing on the court-yard was inhabited by the Abbe de Coulanges, and the Marquis de Sevigné lodged in the apartments on the street. Several financiers inhabited the hôtel after Madame Sevigné, among others the Fermier-General Brunet de Rancy. During the Revolution the directorate of the library was installed here. Next was seen here, until 1830, the Ecole des Ponts et Chaussées, directed by Baron Prony. This was succeeded by a wagon-office, and finally by the Institution Verdot. In 1866 the Hôtel Carnavalet was purchased by the City of Paris for the establishment of its library and historical museum. Here, in fact, with the aid of numerous documents one can follow the history of Paris for all times — history curious and captivating, where comedy touches shoulders with tragedy; history illuminated with dashes of glory, and soiled with flecks of blood.

Relics of Gallo-Roman monuments, views of Paris, paintings, drawings, and water-colors, models and different objects are here assembled and methodically classified. A chef-d'œuvre by Boilly, the "Departure of Parisian Conscripts in 1807," attracts the curious. So does a panel by Corot, dated 1840, and representing the "Donjon of Vincennes"; and in the *salon* have been gathered in chronological order, all the faience and porcelains from 1789 to 1799, forming a unique collection of the product of the works at Nevers, which, not having at that time learned how to produce red, replaced it everywhere with yellow, so that the Phrygian cap is yellow and the tri-color flag in blue, white and yellow.

Around the garden, which lies behind the hôtel, new buildings have been added. Old buildings collected from different points of Paris, where they had been demolished, have been brought together here and form an arcaded gallery in the style of the sixteenth and seventeenth centuries. On the left, on the Rue de Francs-Bourgeois, "the arch of Nazareth," which formerly spanned the street of this name in the Cité, at the side of the Palace de Justice and established communication between the old Chambre des Comptes and its archives, here forms a new monumental entrance. This arch, decorated by Jean Goujon, with elegant and sober sculpture, dates from the reign of Henry II, whose monogram, enlaced with that of Diane de Poitiers and her device — the crescent, with the inscription "Donec totum impleat orbem" — it still bears. This entrance is enclosed by a fine modern grille in the style of the Renaissance, after the design of the author of this interesting restoration, M. Bouvard, architect. At the back of the court-yard is the "Bureau des Marchands Drapiers," formerly Rue des Déchargeurs, near the Halles, which MM. Felix Roguet, architect, and Ch. Gauthier, sculptor, have ably restored, after the designs of Jacques Bruant, who built it during the regency of Anne of Austria. The sculptures, quite modern, represent the city of commercial Paris and the arms of the city between two tall caryatides. On the other side of the garden the pavilion of Louis XIV, which occupies the middle of the gallery, is taken from the Hôtel de Choiseul, destroyed by the cutting through of the Rue Quatre Septembre. Under the arcades have been gathered together several fragments of Parisian buildings of the Middle Ages, of the Renaissance, and of the seventeenth and eighteenth centuries. We notice also numerous fragments of the Hôtel de Ville, burned in 1871. Among others, the equestrian figure of Henry IV, the bronze bas-relief which decorated the principal doorway, and which Lemaire restored in 1834 after the ancient bas-relief by Baird. There is also in the garden a vault from the oldest part of the Hôtel de Ville, decorated with the cipher and salamander of Francis I, and in one of the new halls is the ancient door of the same building, and the beautiful rose-window of the sixteenth-century staircase.

AUSTRALIA

THE NEW ROMAN CATHOLIC CATHEDRAL AT SYDNEY. — GOVERNMENTAL ARCHITECTURE IN AUSTRALIA.

SYDNEY, N. S. W.

THE Roman Catholic Cathedral of Sydney, which was formally opened in January, is without doubt, the finest example of decorated Gothic in the Australian Colonies. The choir only is completed; the choir aisles and the transepts still await their permanent roofs; and the nave is not yet begun. And still nearly £150,000 has been expended during the twenty-three years that have elapsed since the foundation stone was laid, and it is estimated that at least £40,000 more will be required to finish the present portion. As it stands, however, the church is considerably larger than Oxford Cathedral, and about the same length as that of Carlisle. The design is cruciform in plan, and comprises nave and aisles, transepts, choir and aisles, a central tower at the intersection of the nave and transepts, and two towers and spires at the west end, or more correctly, the south end, for the exigencies of the site have compelled the architect to disregard orientation. The total length internally will be 350 feet, the width across the nave and aisles 74 feet; and across the transepts 118 feet. The roofs of the nave and choir will be about 100 feet from pavement to ridge. The latter is groined in wood, but the former will have an open timber roof, and the aisles throughout will be groined in stone. It is much to be regretted that the choir roof is not also of stone; for the wood has a cheap appearance, and looks as if it was only resorted to because the clerestory walls were not strong enough to carry stone groining. Another fault is the extreme narrowness of the nave — about 32 feet, I believe — which is considerably less than the width of many parish churches. Otherwise the proportions are very good. The stone used is the splendid brown Sydney freestone; and as the building groups well, and occupies a magnificent site overlooking populous Woolloomooloo, the city and the harbor, it forms the most prominent and pleasing mass in an exceptionally fine landscape.

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The Cathedral was designed by Mr. W. W. Wardell, and is being carried out under his supervision. This gentleman received his architectural education in the office of the late Augustus Welby Pugin, and his name appears in Eastlake's "*History of the Gothic Revival*," associated with those to whose efforts the success of the movement was mainly due. He was at one time occupied as Government Architect in the adjoining colony of Victoria, but his work there did little to advance his reputation; the individuality which alone can give life to a design seems, in a Government office, to lose itself in official correctness and insipidity. This is generally the case in all departmental work and nowhere is it more apparent than in New South Wales, where all the Government buildings are designed in the department over which the Colonial Architect, as he is called, presides. The result is a wearisome succession of large buildings; well designed as far as they go, and well constructed; but with an air of absolute inanity about them which is as irritating in its placid self-sufficiency as the vacuous smile on the face of a fool. The railways are all constructed by the Government in these colonies, and the railway stations are, of course, the work of one Government department, while the design and construction of the State schools is entrusted to another.

There are a great number of these schools built every year, and they are generally very expensive edifices; so expensive in fact, that it recently occurred to the Minister at the head of affairs that it would be perhaps cheaper to have them built all on the same model. In accordance with this brilliant idea, plans of schools of assorted sizes, have been prepared, details and all, and then photolithographed, and the draughtsmen's services are no longer required in the Department of Education. Previously, accidents of site, locality and aspect, necessarily varied the designs a little, and made some less ugly than the rest; now the only variation will be in size, but the ugliness will still be common to all. From this it will be inferred that the scope for an architect in private practice in Sydney is not too extended; for such other public buildings as do not directly concern the Government, generally fall within the province of the Municipal Council, and are consequently carried out by the City Architect.

LONDON

THE BILL FOR THE REGISTRATION OF ARCHITECTS. — THE ARCHITECTURAL ASSOCIATION. — THE QUESTION OF BUILDING LEGISLATION.

WITH the opening of Parliament we are again visited by the Architects' Registration Bill. The measure is in all main respects identical with that previously presented, with the chief exception that Scylla has been forsaken for Charybdis, and that now it is only proposed to include architects within the scope of the bill, and not engineers and surveyors as in former measures. I need hardly detail the points of the proposed Act of Parliament. The preamble states that it is framed to enable "persons requiring professional aid in architecture to distinguish qualified from unqualified practitioners," an euphemism which disguises sufficiently the trades-union character of the movement. The bill then proceeds to call into existence a "General Council of Architectural Education and Registration of the United Kingdom" which is to be composed of thirty persons, of which five are to be sent by the Royal Institute of British Architects, one by the Royal Academy, one by the Institute of Architects of Ireland, two by the Society of Architects, two by the Architectural Association, five by Provincial Societies, and nine by universal suffrage of the profession. Scotland and Wales are not considered of sufficient importance to be directly represented, and the Architectural Association, founded in 1842 and consisting of over eleven hundred members, receives equal representation with the Society of Architects founded in 1883, and but one-third the size. The Society though are the chief supporters of the bill, so the unequal representation can be accounted for. These are, however, details. The machinery by the aid of which we are to reach the Elysian fields of perfection is then described. A fit commencement is made by officially hall-marking as fully qualified architects any persons who have intermittently made or caused to be made, plans during a certain defined period, and to complete the handiwork, certain other persons such as sanitary municipal engineers and surveyors, and students who have attained the age of twenty-two, are to be received into the sacred fold.

This interesting achievement successfully accomplished, the bill proceeds to put an end for once and for all to such absurd notions as a collegiate education for architects by rendering compulsory a three years apprenticeship to the officially hall-marked registered "architects" whom it has just created. The next step is to institute an examination, which the Royal Institute of British Architects is graciously permitted to carry on, but in case the Royal Institute shows any sign of restiveness or self-will, the General Council is invested with power "to secure the maintenance of a standard sufficient to guarantee the possession of knowledge and skill requisite for efficient practice." Other clauses provide for the publication of the names and addresses of the officially hall-marked "architects," the disability of those not officially hall-marked to recover costs in a Court of Law, the annexation of all public appointments to the officially hall-marked, and "other details to which it is unnecessary to refer." There are, however, one or two little points that have not been considered of sufficient importance to incorporate in the bill. For instance, no provision has been made against the practice of architecture by incapable men, and by the simple omission of the word "architect" jerry-building and jerry-architecture can flourish in all their innocent simplicity. In conclusion we are blandly assured, that there is nothing in the provision to which any reasonable person can take exception.

The measure is comprehensive, as it provides for the whole profession, irrespective of members of representative bodies, and as it is well to put an end to carping, we are informed that "the unanimous opinion of the whole profession, not only in this country (England), but in France, in America, and Australia is, that the principle of registration is the only practicable one to deal in a comprehensive way with the matter." In the face of this, it is, perhaps, beside the point to mention that petitions have been presented against the bill by (1) the Royal Institute of British Architects, (2) the Architectural Association, (3) the Royal Institute of Architects of Ireland, (4) the Bristol Society of Architects, (5) the Glasgow Institute of Architects, (6) the Leicester and Leicestershire Society of Architects, (7) the Manchester Society of Architects, (8) the Nottingham Architectural Association, that the Parliamentary Committee of the Liberty and Property Defence League have placed the measure among the condemned bills and that the government have decided to oppose the bill. As a matter of actual fact, it is the general opinion of persons whose views are worth listening to, that the bill does not stand the slightest chance of becoming law.

The gist of the whole matter is this, the "Architects' Registration Bill" is being "run" by a clique of men termed the Architects' Registration Committee, who do not represent the profession in any sense of the word, and who do not contain among their number any persons who could lay a justifiable claim to be termed the leaders of the profession. Under these circumstances, it is easy to understand that the bill is naturally very incomplete and crudely constructed. The proper course to pursue in carrying through Parliament such a measure as this, affecting as it would most seriously the whole profession throughout the world, would surely be to secure as far as possible the unanimity of the whole profession, and not attempt to pass it in the teeth of the opposition of those who are accepted as the leaders of the profession and loyally supported by all the right-thinking architects. A movement of this character should be made and made only by the Royal Institute of Architects in their capacity as the leading professional body in the kingdom, and if, as the registrationists assert, the whole profession believes in the principle of registration, it is difficult to conceive why they have not prevailed on the Institute to take action in the matter. *Then* the proposition would have some weight and might receive the very earnest consideration of Parliament, but to imagine that the Legislature of Great Britain is going to issue a fiat in favor of a complicated and far-reaching measure, whose very elementary principles have hardly been discussed by those for whose benefit they are supposed to be framed, is really too absurd.

Another movement, seeking the same end as registration, is to be discussed at the Institute on Monday, the 31st inst. The suggestion, which may possibly prove a *modus vivendi* for all parties is, "That at an early a date as possible, statutory powers should be sought to establish, as in other professions, a system of compulsory examination, to be held by the Institute, and to be extended to all architects hereafter entering the profession, whether as members of the Institute or not." I will endeavor to attend the meeting on the 31st, as I expect there will be an extremely interesting discussion.

Meanwhile, ignoring these storms on the arena of architectural politics, the Architectural Association is pursuing the even tenor of its way, and devoting itself to deeds, rather than to words. The Education Committee has been sitting very regularly and continuously throughout the session, and it is to be hoped that they will soon be in a position to present their report. It is, of course, impossible to say what this will be, but rumor has it that it is of a very drastic character, and recommends the assumption by the Association of the functions of a leading central teaching body for students, with a regular course of instruction and staff of paid instructors. Whether rumor is to be trusted remains to be seen.

Some very interesting papers have lately been read at the Institute. The most notable was by Mr. John Slater, B. A., on "Building Legislation," and great credit is due to the author for the thorough and comprehensive manner in which he compiled his paper. Prefacing his remarks by a reference to the enormous increase in the population of London and the manufacturing districts of Lancashire and Yorkshire, Mr. Slater asked whether the building regulations now in force, not only in the metropolis, but also in the majority of our great cities, were suitable and sufficient for the necessities of the present day. He personally thought not, and considered that the metropolis should have a building act which would be a model for other towns.

A short *résumé* of Roman and Mediæval building legislation led up to the Acts of Parliament now affecting the metropolis, which were no

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less than fourteen in number. This induced the author to give utterance to the following very excellent sentiments, in which he argued in favor of the embodiment of all these complicated acts in one great measure. "It was essential," said Mr. Slater, "that all regulations as to streets and buildings should be codified and embodied in a single document, and that piecemeal legislation should cease. The act should regulate the width, construction, sewerage and gradient of all new streets, the line of frontage of the houses, and should provide a sufficient number of adequate open spaces. It should define clearly the difference between public and private buildings; should exercise control over the situation and construction of the former, and the means of ingress and egress. To secure the prevention of fire, due stability and healthiness in all buildings, it should control the site, the construction of foundations, walls, floors, roofs and chimneys, the drainage, the amount of space about a building, and the height of a building in connection with its position. It should provide an executive for carrying out its provisions, and a special court of appeal for all disputed matters. Regulations as to **noxious trades**, infectious diseases, common lodging-houses, etc., should be relegated to a special sanitary code as in New York."

Mr. Slater then dealt at considerable length with the foregoing points, one by one. The present regulation as to the width of new streets — that they shall be at least 40 feet wide — was not sufficient; for a much-used thoroughfare, there should be a carriage-way not less than 42 feet. The definition of a public building should be as wide as possible, and none should be allowed to be erected with a frontage to one street only. Any restriction as to cubical contents was unnecessary as a hard-and-fast rule, and there ought to be a discretionary power of allowing larger buildings to be erected, if the authorities were satisfied with their construction. With the increased knowledge of the behavior of stone and iron under heat, it was absolutely criminal to allow stone staircases carried on unprotected iron supports in buildings used as flats; and, in fact, all the provisions as to fire-resisting construction needed remodelling. The securing of due stability was an important point, and perhaps the most crying defect in the Buildings Acts was that the controlling officers had no power whatever over the materials used other than bricks and mortar. It would not be difficult to frame a schedule which should stipulate, for instance, that lead for gutters should be of not less than, say, 5 pounds per foot super.; that zinc should be not less than 16 ounces, etc. It was also time that some regulations as to the use of iron in buildings should be laid down, such as, for instance, the minimum depth of a girder spanning a certain opening. If such details were not to be provided for, then the superintending officials should be empowered to satisfy themselves as to the stability in each individual case, and be made responsible. With regard to drainage, he thought the sanitary officers of the various "vestries" (our London local Councils) did their duty well; but he considered a divided control unwise, and that the same officer should be responsible for both the erection of the building and its sanitation. Provision should be made for underground rooms being, to a certain extent, protected from the damp, either by the walls being built in cement or by forming a dry area. The close juxtaposition of the houses was a great evil in large cities, and a regulation prescribing a minimum distance between the backs of all houses, large or small, was most urgently needed. The existing provision was positively ridiculous, because it simply prescribed the *area* of the open space in the rear of a building. The minimum depth of that open space should depend on the height of the house, and should be at least equal to it. In the case of buildings facing public streets, the width of the street should govern the height of the house as a general rule, as in Paris, in nearly every city of the German Empire and in Sweden. In the last-mentioned country, streets 32 feet wide and less might have houses 43 feet high; up to 44 feet, houses 54 to 56 feet high; and streets about 44 feet might have houses 66 feet high. Such stipulation was eminently reasonable, but power should be given to relax the rule in certain cases, provided the construction satisfied the controlling officer of the Building Department as to fire-resistance, stability, etc. In order to avoid a monotonous sky-line, a clause might be framed to the effect that if the front of a building be carried up as a gable, then the limit should apply, not to the apex, but to half-way up the gable. The regulation of the relations between adjoining owners as to works to party structures was then dealt with, and reference made to the 1844 Building Act, which had a very wise provision, under which, if the adjoining owner did not give his consent, the matter was referred to the District Surveyor, who was required to report on the matter to the Court of Appeal. With reference to light and air (English laws on this matter are very complicated and troublesome), a clause to the effect that a building owner should give notice of rebuilding to all parties who could be affected, and their surveyors empowered to investigate the matter and to decide by a majority whether the building would injure any one, and, if so, the compensation to be paid, or to absolutely veto the proposed rebuilding, would be an immense gain to a building act in a large city.

Mr. Slater's paper has received a great amount of attention, the Institute giving a special evening for its further consideration. No definite steps were actually taken, but there is a strong feeling among the members that the Building Acts of London should be entirely reconstructed and consolidated in one Act, and there seems a probability that the Institute, in its rôle of leading professional society, will take the initiative and approach the County Council on the subject.

I can only just mention the other matters that have occurred. Visits have been paid by the Architectural Association to Mr. D'Oyley Carte's new theatre at Cambridge Circus, to the Imperial Institute under Mr. Collcutt, to the new Police Headquarters under Mr. Norman Shaw, R. A., and to a hospital for women, and administered entirely by women, under Mr. J. M. Brydon. Papers have been read by Mr. E. W. Mountford on "Public Libraries," by Mr. R. Elsey Smith on "Greek Architecture," and by Mr. Henry Holiday on "Modernism in Design." Mr. Fulleylove has given us a charming exhibition of his sketches in Cambridge, tallying with his previous work at Oxford. Relics of the Royal House of Tudor have been on view at the New Gallery, and Art in connection with Sport at the Grosvenor. Yet another new picture-gallery has been opened in Regent Street, under the title of the Victoria Gallery. "Humorous and Grotesque Art" was the title of the first exhibition, but it did not seem to be a success. It has been succeeded by a collection of articles that have a direct or indirect bearing upon the lion of the hour, Mr. H. M. Stanley. The Forth Bridge has been opened by the Prince of Wales in the presence of a large concourse of eminent persons, including M. Eiffel.

Generally, things seem doing fairly well in the profession in England. Architects, as a rule, are busy, and there are fewer grumblers than usual.

THE ARCHITECTURAL EXHIBITION AT THE ART CLUB.

THE Exhibition of Architecture and the Allied Arts, which is being held under the auspices of the Art Club, compares very favorably with the last one of the Architectural League of New York. The Committee has been very severe in its selections, with the result that while there are only a little more than two-thirds as many drawings as in New York, the standard of excellence is higher. The Loan Exhibit, about twice as large as that of the Architectural League, is many times more valuable than the latter and more instructive, but somewhat disappointing in the number of its original designs.

On entering the admirable gallery that Mr. Day has designed for the Club, one is surprised at the general restful effect of the room. There is, owing to the good judgment used in hanging the drawings, no spottiness. And whether because one has not, as is usual, to pass through rooms glowing with the rich colors and gilt of a collection of framed paintings, or because of the pleasant tones that Mr. Cariss has combined in the background on which the drawings are hung, one does not feel the chill that is apt to run down one's spine on entering a room lined with drawings whose broad margins of white paper stare out cheerless and cold. As, for instance, at the *Salon*, where the loneliness of the architectural room has become a by-word.

The catalogue of the present exhibition, which contains, by the way, excellent reproductions of some twenty-four of the drawings, has for all preface the words which Longfellow puts into the mouth of Michael Angelo:

> "Ah, to build, to build!
> That is the noblest art of all the arts.
> Painting and Sculpture are but images,
> Are merely shadows cast by outward things
> On stone or canvas, having in themselves
> No separate existence. Architecture,
> Existing in itself, and not in seeming
> A something it is not, surpasses them
> As substance shadow."

However comforting to architects such a dictum may be by an authority who knows so intimately whereof he speaks as Michael Angelo, it is the very fact that architects' drawings have in themselves (or at least it is the devout hope of their authors that they may have) a "separate existence," and are not in themselves architecture, that makes an exhibition of them so much less attractive to the public, ignorant or cultured, than a room full of the same number of statues and pictures.

A noteworthy feature of the present exhibition is the work done by students in the various schools. This exhibit takes up nearly the whole north wall of the gallery and a part of the east. The largest showing is made by the Massachusetts Institute of Technology, the next by the School of Mines of Columbia College, the third by the Ecole des Beaux-Arts at Paris (if we omit those made there by men who are now professors at the schools mentioned, and whose drawings are classed with the exhibits of these schools), while the University of Pennsylvania brings up the rear with a solitary drawing of the Gate of Judgment in the Alhambra, a very careful piece of work by Mr. Frank Miles Day. A place of honor on this north wall is given to Mr. Hubert G. Ripley's design for a hotel. Not knowing

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what the requirements may have been it is impossible to judge of the merits of his plan, which is naturally a perfectly formal one. Everything is arranged with reference to this or that axis, and one turns to this plan, as to most of those on the same wall, with a pleasant sense of relief at the thought that here the designer has willingly passed by the inevitable striving after irregular picturesqueness in his search for formal dignity. The plan is rendered to perfection, as in the elevation, in graded washes of water-color. Either of these drawings is exactly what one would expect of a well-trained student at one of the Continental schools of architecture, but the perspective, a thoroughly good example of pen-and-ink work, is of a kind that if it were commoner among European students might be greatly to their advantage in design.

Another drawing by the same author seems to me to be not up to this in excellence, namely, a design for a campanile. Another one, not in the catalogue, but numbered 192, more Italian in outline, is most graceful and strong, and soars exactly to the right height to satisfy the eye. This may also be said of a simple one by Mr. Edgar V. Seeler, where the proportions of the plain brick shaft to the rest are very satisfying. The delicacy of Mr. Vernon A. Wright's rendering of the same problem is carried so far as to take away from its effectiveness.

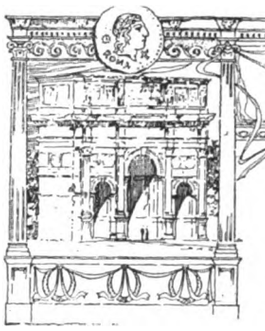
Mr. Seeler has three other designs; a pavilion, a well-rendered entrance and an exchange, this last somewhat bare, and of which the treatment of the huge triple windows in the end is open to criticism.

Mr. Thomas R. Kimball has an excellent design for an art club, very rich; in dark washes of India ink. Mr. Emil C. Mueller a clean India ink wash-drawing of Greek design for a porch, and Mr. Walter H. Kilham, a most admirable piece of work in his design for a museum of natural history. The plans of it is an example of irreproachable rendering, and looks as though done by a first-classman in the French Government School. Mr. George C. Shattuck has a plan for a school of art. This is another example of perfect rendering. Even without the requirements it is easy to see that the plan is carefully studied and the rendering faultless. Mr. Shattuck also shows one of the two designs for a theatre. His recalls the general arrangement of the front of the Opera-House in Paris, as does also Mr. E. B. Homer's, whose correct, but warm coloring of the façade, pleasantly harmonious throughout, helps to make the composition a most attractive one. For color that is by contrast spotty and disconnected, although skilfully handled, we should turn to Mr. Arthur W. Rice's design for a cyclorama building. Messrs. Escalier and Letang, professors at the Institute, send two most interesting *rendus* made in the Ecole des Beaux-Arts.

Mr. Escalier's is an Italian villa. The plan itself is very small in comparison with the garden that surrounds it, with its walks, its trellises, its statues and its terraces. The elevation is charming, reminding one vaguely of the Villa Medicis. It is rendered with more pencilling than is usual, and has in the foreground a little Chinese white.

Mr. Letang's problem is a portico. It is really inspiring to see an elevation so well rendered as this. It is done in what is perhaps after all the most effective method possible, to wit, India ink washes with a suspicion of color. A little ultramarine mixed with the *poché* at the top of the windows, a hint of green to show the material of the bronze doors at the back, and then beyond and filling up the sheet to its margin the India ink outline of the stonework of the building from which the portico projects. In the exhibit of the School of Mines of Columbia College, but made like the two above, in the Ecole des Beaux-Arts, is Mr. L. Chiffot's "Bourse Maritime," a noble design showing an impressive building with a dome that exactly suits it, the whole in that perfect proportion of all the parts that makes one feel instinctively that it is "just right." If, as was hinted above, it would do no harm to French students if they would sketch and design in perspective a little more than they do, they could truthfully retort that it would neither impede our knowledge of construction nor of perspective if our students should devote a little more time to really finished and difficult drawings such as the sectional perspective of this same "Bourse Maritime." The elevation for Mr. Dufosser's "Hospice," an attractive drawing in red, buff and brown, shows another building of perfect proportions, and is beyond criticism. Mr. Alfred D. F. Hamlin has a large Ecole design for the central pavilion of a palace. Two students of the School of Mines, Messrs. S. W. Andrews and I. M. Hewlett send designs for memorial chapels. Of these the first has a dome a little high and obtrusive. The other is beautifully proportioned, but has a fault in the rendering that is very common—all that part of the building that projects is so much warmer in color than the main body which recedes that it looks as if made of a different material. The colors jump in this case, indeed, from a warm brown to a cold blue, without passing through the intermediate gradations that make such a violation of truth excusable in the hands of a colorist like Mr. Luce, for instance, and when he has the aid of perspective to show the projections in their true value. Mr. A. W. Longfellow, Jr., sends two of his *projets* done at the Ecole des Beaux-Arts — a "Séminaire," and a beautiful "Maison d'un Statuaire." Three other Ecole drawings are Mr. John Stewardson's detail in color of a piece of Tuscan construction and Mr. Reinhardt Dempwolf's large India ink drawing (perhaps the best detail in the exhibition) of a restoration of the cornice of the Temple of the Sun at Rome, and a study for a shrine — a periptery temple like that of Vesta.

Some description of the rest of the Exhibition, including the Loan Collection, will be given next month.



ROME

TWO NEW MUSEUMS OF ANTIQUITIES. — THE MUSEUM OF URBAN ANTIQUITIES AND THE MUSEUM OF ITALIAN ANTIQUITIES.

FOREIGNERS who have this year visited the Eternal City have shared the agreeable surprise of finding two museums which are not yet enumerated in the tourists' guide books, the creation of which is due to the intelligent care of the Italian Government. It is, alas, a very feeble compensation for the acts of official vandalism which have so cruelly ravaged in these last years this illustrious capital of the arts, this august city, which has been the cradle of history and the hearth of Christian civilization. The most precious monuments have been molested, the most venerable remains of antiquity have been delivered to the basest speculation, and under the pretext of enlarging and embellishing and making more healthy, they have destroyed the *cachet* of majesty which everywhere marked the physiognomy of this city, so dear to poets, to artists, to men of learning of every country and of every age.

The carelessness of the popes, it must be confessed, allowed many historical relics of great importance to be damaged, and contributed to give to Rome the aspect of a city where the benefits of civilization, the principles of propriety and healthy municipal ideas made their way only with difficulty. But the rage for blind innovation, which the new administration has given evidence of, makes us almost regret a time when a deplorable routine only exposed our public monuments to the inevitable attacks of the weather. One may say that incapacity and the mania for transforming with which the Italian Government is animated have done more evil to Rome in twenty years than the negligence of certain pontiffs caused in ten centuries. On this point everybody is agreed, and the lively complaints formulated by foreign archæologists and especially those of France, Germany and England, are only too well founded. But since in the midst of so many errors the power which rules at present over the banks of the Tiber has been able to accomplish one meritorious act, let us award it the praise it deserves.

The two museums of which I have just spoken are the Museum of Urban Antiquities, established in the Baths of Diocletian, and that of Italian Antiquities, which has its home on the Flaminian Way in the villa of Pope Julius. To appreciate the importance of these two institutions, which date to the commencement of the last year, it is well to sketch in a few words the care displayed in these last fifteen years by the Ministers of Public Instruction, upon whom matters of this kind depend, in order that the most important archæological finds might not be scattered. M. Bonghi was the first Minister who, in 1875, established at the Ministry a general direction of antiquities, which watched vigilantly not only over the excavations at Rome, but over all those which are carried on in the provinces, in the grand historic centres, and of which the products up to that time had remained buried in isolated places, lost to sight, or more frequently secured and carried away by foreigners. This general direction named, appointed at the principal centres inspectors charged with directing the searches, cataloguing the results and determining their character and value. I ought to say that frequently the choice of certain inspectors has not been a happy one, and they have not been fully fitted for their tasks. I know some who do not know a word of Greek, who understand Latin very imperfectly, and who are, in consequence, not always in a condition to judge of the importance of a discovery to such a degree that in more than one case it has been German archæologists who have definitely determined, when they accidentally found themselves in those neighborhoods, the real character of the finds; but these are faults of execution which will disappear with the passage of time in proportion as historical studies are better developed in Italy, and the Government will find for its archæological inspectors a better instructed and better experienced staff. The dispersal of documents, of objects of an archæological value, have occurred also from the fact that the Communes were not always in a position to incur the expenses which a systematic collection always requires. The Government has therefore established subsidies in favor of the Communes which already possess collections, and it is in this way that the Museums of Antiquities at Este, Bologna, Florence, Chuisi, Orvieto, Viterbo, Reggio, Toranto, Syracuse and Cagliari, have taken on in these last years a large development.

I have visited these museums one after another, and have proof that they contain sufficient elements for the reconstruction of the political and artistic history of Italy. With the material included in these collections one could to-day, in a measure, completely describe the daily lives, and picture to one's self, the religion, the tastes, the dwellings of the most ancient inhabitants of the peninsula, as to whom books have given us until now only vague and often fallacious indications. In this respect one might say that the initiative of the Italian Government is destined to produce in a short time precious fruits, and the learned of the whole world will be beholden to it.

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About the same time M. Bonghi conceived the idea of creating at Rome a vast collection of national antiquities, and in fact he opened in the dependencies of the Kircher Museum attached to the Roman College epigraphic and pre-historic sections; but the apartments chosen for this purpose were not sufficiently large and lacked light. These rooms were quickly filled up, and then the officials were reduced to remove, provisionally, here and there amongst the warehouses, under sheds and so on, objects of the greatest value. Such, for instance, was the lot of the statues of the Vestals found near the portico of Vesta; of the paintings and stuccos discovered near Farnesina; of the statues which adorned the sepulchre of Sulpicius Platorinus; of the bronzes found on the Via Nazionale in digging the foundations of the Dramatic Theatre; of the bust of Dionysius found at the Villa of Hadrian at Tivoli, and of the hermaphrodite discovered amongst the ruins upon which had been built the Tietro Costanzi. It was impossible to allow this disorder to continue without running the risk of losing important fragments, which, moreover, were not being made of use, since the public could not examine them at leisure.

M. Boselli, who was the successor of M. Bonghi, and who to-day is still at the head of the Department of Public Instruction, wished in his turn to put an end to these inconveniences, and give a new start to historical and archæological studies. In the first place he revived the archæological schools destined to instruct the youth in the study of the affairs of the past, a study which is always a little dry at the outset. Then he founded at the University of Rome a chair for instruction in ancient art, and finally by a decree which dates from the month of February, last year, he established the two museums which I mentioned at first, and one of these, which is established at the Villa of Pope Julius, is intended to receive the relics of monuments of importance and the inscriptions found in the Roman provinces, while the other, housed in the Baths of Diocletian, is particularly reserved to the antiquities of Rome itself.

From these two sections of the new National Italian Museum, the most interesting, the most curious, because of the novelty of the documents which it encloses, is surely that at the Villa of Pope Julius, consecrated to suburban antiquities. Although destined to contain all the finds of value discovered beyond the walls of the capital, almost all the objects which are arranged there up to the present time are related to Etruscan history, because archæological research of late has turned more particularly to the places where we know were interred relics which belong to that grand race which preceded the Roman people in the way of civilization, and which seems to have been one of the most powerful intermediaries between Grecian and Italian genius. The greater part is occupied to-day by antiquities coming from Faleries, which was one of the richest and most flourishing of the Etruscan cities, and occupied one of the most beautiful heights which surround the Lake of Bolsena. Some of these antiquities date back eight centuries before the Christian era, and throw some light on the past of that grand nation of which as yet we possess only vague and unformed ideas. The objects have been arranged according to their age, so that in the first place one may analyze rustic utensils of a make relatively rude: we find here the spherical and also the cylindrical urns which differ sensibly from the urns belonging to the same time which are seen at the Museum of Bologna, which are formed by two cones connected by their bases. Apropos of tombs, which belong to this epoch, there is a curious fact to record: several have been found made out of the hollowed trunks of trees which still contain in their cavities remains of bones. These discoveries confute those who have pretended that the ancients, without exception, practised the system of incineration and that the honor of having introduced the method of inhumation belongs to the Christians. The wooden or stone coffins found in great numbers in the necropoles of central and northerly Italy prove, on the contrary, very clearly that several centuries before the birth of Jesus Christ, in certain cities the burial of bodies was practised and from the diversity of modes of sepulture employed we can even deduce the fact that the people who inhabited these countries followed in this respect differing usages and consequently were not all of the same race. It is not to be doubted now that the rule of the Etruscans extended from the Mediterranean to the Adriatic, and from the Cimian mountains, which on the north border the Roman Campagna, as far as the valley of the Po. But the methods of sepulture are the most characteristic signs which serve to differentiate the customs of nations, and from this point of view we can conclude that the Etruscan nation, although forming a homogeneous body politic, was composed of very dissimilar elements, obeying doubtless multitudinous traditions, customs and social laws. This point is of the highest interest for the future of the history of the Etruscan people. Articles of ornament found in the Falerian tombs, which are here brought together in great numbers, also aid us to fix another fact in Etruscan art, namely, that this art was autonomous up to a certain epoch, and has not always been a derivative, as has until to-day been asserted, from Hellenic art. One scarcely encounters a semblance of imitation of the importation of Phœnician art which have been found in large quantities in other localties. It is true that in the Falerian collection metal-work, and especially work in precious metals, is wanting, because it can be proved by indisputable signs, that the tombs from which existing remains came were violated and pillaged by the profaners of sepulchres. In only one of them there was found in one corner, as if the robbers, after having laid it aside, had forgotten it, a fragment of a scabbard of bone and ivory incrusted with amber, and another scabbard of bone with its blade, and some smaller bits of bronze and gold work, such as fibulas, combs, etc. All these objects bear evident traces of imitation of Phœnician work. It is only in the case of these articles which belong to the most recent epoch, that we can remark an effort at imitating Hellenic art, properly so called.

The imitation of Greek ideas visibly dates only to the third period of Falerian civilization. The objects which were included in this period leave no doubt as to their origin, and it is plain from this moment that Etruria was conquered, not only by the articles imported directly from Greece, but also by Greek artists and artisans who imposed their tastes and their manner upon the conquered country. But before this date the region about Bolsena had escaped Hellenic influence. For the rest we must recognize that so long as it was left to its own devices Etruscan art did not know how to vary from archaic forms, and that foreign influence largely contributed to refine it. Among the amphoræ of the Corinthian school, which are classed in the Falerian collection, I remarked one of the greatest interest, for upon it is represented Dionysius between two satyrs who each bear upon his shoulders a Bacchante, and another one where is seen Æneas bearing his father Anchises on his back, and surrounded by two women, one of whom has the features attributed to Venus.

In the way of curiosity, among the subjects here shown, I ought to mention also two cups, one of which bears a Hercules kneeling by the side of Minerva, who hurls a dart against Geryon; and on the other, two kneeling youths who each have in hand a cock which they are exciting to combat. Here the Grecian origin is incontestable, for we know that it was the Greeks who instructed the Etruscans in mythology. Before them the Etruscans did not know mythology, or only knew it imperfectly, and we have the proof of it in the mythological scenes which figure on the amphoræ of the first epochs, upon which the history of Olympia is sometimes very singularly distorted. But the scene with the cocks is too intimately allied with Grecian customs for us not to see in this cup a specimen of Hellenic importation. We know that the Athenians were ardently devoted to this kind of sport, which to day turns so many heads in England and Spain. We also know that they assigned one day in the year for this spectacle, and that they were accustomed to excite the war-like ardor of these birds by making them eat garlic before the battle.

I should fear to weary the attention of your readers if I should pursue this enumeration, which, nevertheless, has for me many attractions. I should be happy if I had been able, even imperfectly, to give them a clear idea of the importance of this new museum, and suggest to those who are shortly to visit Italy the idea of inspecting it. I am sure that they will be grateful to me for having given them this notice.

In the way of matters purely architectural, this collection has confirmed me in the opinion that I have formerly expressed as to the little influence that the Greeks have exercised over Etruscan architecture. Hellenic art only attacked the accessories, the objects of secondary importance, and only after a manner hypothecated the ornamental portion of Etruscan products. Etruscan architecture preserved its primitive character, its heavy forms, its simple straight lines. As a means of determining this, we have only the tombs and bits of design, which are very rare of course, upon the amphoræ representing fragments of architecture. But the fact that in spite of all search it is possible to discover in the soil of ancient Etruria only necropoles and that in none of the explored ruined cities has been found up to this day the traces of any important grand monument prove clearly to my mind that the great architecture, or monumental architecture in a word, was ignored by that nation. It may be that archæological research may ultimately prove the contrary, but for the moment no discovery has been made which prompts us to conceive a very high respect for the architectural taste of the Etruscans. Not a temple proves to us the grandeur of this people, not a public building of any value inspires us with admiration for their artistic feelings. This race, whatever may be said of them, appear to us to-day a people of the second rank. A brutalizing superstition and the worship of false gods joined to an excessive taste for sensual pleasures and an excessive depravity, of which the designs on their amphoræ give us numerous proofs, engulfed their spirit and caused the atrophy of their genius.

Among the meritorious deeds which M. Boselli, the present Minister of Public Instruction, has accomplished, I ought also to mention the recent decree for the establishment of regional commissariats of the fine arts, so as to apply the principle of decentralization to historical studies in art. The Government, with the intention of preventing the awakening of the particularism which formerly had such disastrous effects on the political well-being of the peninsula, had everything concentrated in its own hands, and this greatly hindered the development of that local initiative, without which archæological studies are always incomplete in a country which, like Italy, is strewn at every point of its territory with most enviable historic treasures. On the other hand, the State, by nature a little thoughtful of anything which did not represent an immediate and palpable interest, had consecrated to this branch of the administration only modest appropriations. Italy is the richest of all countries in monuments, and it is nevertheless, the one which spends least, proportionately, for providing for their discovery and preservation, although it is the only one which has had the unfortunate idea of imposing a fairly heavy tax for admission to the museum of paintings and

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antiquities. France spends thirteen millions a year for the fine arts and antiquity. Everywhere else, moreover, private society lends a pecuniary and intellectual aid to studies of this kind, while in Italy the public indifference to this sort of thing has arrived at such a point, that it would be very difficult to mention an artistic society which is distinguished by any serious work.

In virtue of the decree which I have just mentioned, Italy is divided into twelve regions, Piedmont, Liguria, Umbria, Tuscany, the Marches, Emilia, Lombardy, Venetia, Sicily, Sardinia, and Naples, each of which will have over it a commissary, who will direct the studies throughout the province placed under his jurisdiction, with the assistance of a special technical staff, and aided by all the scientific, artistic and historical institutions existing in his district. He will be able in case of urgency to make the necessary arrangements concerning the final disposal of important finds, as well as for the preservation of the monuments which the State places in his care. Unfortunately it is money that is wanting, for the Italian Government hardly spends four millions a year for the care of the relics of antiquity and the artistic treasures of which it is the depository. The commissaries, although animated with the best of intentions, will often be confronted with material impossibilities; but their creation indicates an awakening feeling for art, from which it is fair to augur well.

Modern Italy owes a reparation to the world of artists whose sentiments she has cruelly wounded through tolerating the dispersal of the most precious relics of the past, and in shielding with the cloak of her responsibility the disgraceful speculation which has profaned Roman soil, which has given to the city of the Cæsars and the Popes the physiognomy of a vulgar bourgeois city. This sin calls for expiation, and the best of expiations would be to show in the future more tenderness and solicitude for the arts and history, and to make the necessary pecuniary sacrifices to give to these fair sentiments practical sanction.

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE AT WEST PHILADELPHIA, PA. MR. A. W. DILKS, ARCHITECT, PHILADELPHIA, PA.

[Gelatine Print issued only with the International and Imperial Editions.]

COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK, N. Y. MR. R. M. UPJOHN, ARCHITECT, NEW YORK, N. Y.

[Issued only with the International and Imperial Editions.]

SKETCHES BY A ROTCH TRAVELLING-SCHOLAR, MR. E. A. JOSSELYN.

[Issued only with the International and Imperial Editions.]

TWO HOUSES—"ROCK-RIDGE;" "TURTLE-POINT;"—AT TUXEDO, N. Y. MR. BRUCE PRICE, ARCHITECT, NEW YORK, N. Y.

THESE houses are in the school of megalithic work which has been the result of the use of the natural material found at Tuxedo. On the mountain slopes of Tuxedo are tremendous rock-slides and there are vast accumulations of magnificent building material, all shaped and squared ready for building and covered with mosses and lichens.

Mr. Price's first work in this direction was the entrance gates to the Park and these turning out very successfully, the engineers carried the curtain walls which flank the two buildings at the gate, out in the same character of work, only using larger stones. The construction of these walls starts with stones weighing from a ton to three or four tons, set up on end and standing about six feet high from the ground, and upon this, rises a couple of feet higher, what is called an Irish parapet. The work is truly megalithical.

In the other buildings that Mr. Price is now putting up at Tuxedo, he has carried out this idea and has started all his house-walls with stone as large as could be handled, gradually decreasing them in size towards the top. Another point, the gate buildings were built very ruggedly; the stone lay upon their bed in the walls and consequently each stone jutted out boldly according as its contour was more or less rough and the joints between the stones became very deep seams.

This method he felt was a little too rude and in a house at Boulder Point, which was the next one he built, he reversed the method of laying the work and sought to get the stones with their square surface for the face of the wall, still preserving the idea of standing the stones pointing upwards, as the big stones in the first courses were laid. The effect of this house is much stronger than that of the gates.

In the Turtle-Point house the architect has ventured a step still further beyond the methods of work at Boulder Point and has laid the work on horizontal lines, with the square faces to the surface.

The Rock-Ridge house will be executed the same as the Turtle-Point, with the windows and openings trimmed with long coins and arches of dark spotted Roman brick.

THE NEW ROMAN CATHOLIC CATHEDRAL, SYDNEY, N. S. W. MR. W. W. WARDELL, ARCHITECT.

[Additional Illustrations in the International Edition.]

ROUMANIAN RESTAURANT AT THE PARIS EXPOSITION OF 1889. M. O. ANDRÉ, ARCHITECT.

[Etching.]

THE WINTER RIDING-SCHOOL IN THE IMPERIAL PALACE AT VIENNA. BARON FISCHER VON ERLACH, ARCHITECT.

[Gelatine Print.]

THIS is one of the last examples of the "baroque" style, and was built in 1728–42, by the great architect, Baron Johann Bernhard Fischer von Erlach. The ring is eighty feet wide by about two hundred and ten feet long, one end forming a segmental curve. In the middle of this end, which is shown in our interior view, is the Emperor's private box. Two tiers of galleries surround the remainder of the ring.

INTERIOR VIEW OF THE SAME.

[Gelatine Print.]

UNITED STATES TRUST COMPANY'S BUILDING, NEW YORK, N. Y. MR. R. W. GIBSON, ARCHITECT, NEW YORK, N. Y.

IN future, we hope to be able to make arrangements to avoid the repetition of illustrations.

COMPETITIVE DESIGN FOR MUNICIPAL BUILDINGS, SHEFFIELD, ENG. MR. ERNEST RÜNTZ, ARCHITECT, LONDON, ENG.

THE building is arranged in four stories, viz., second and first floors, ground and lower ground floors, the main entrance being from Pinstone Street. The grand staircase and entrance-hall, giving access to all the principal departments, to be decorated throughout in faience, with mosaic pavement and marble steps; the council-chamber to be centrally situated in the building on the first floor level, entirely away from the noise of traffic, to be 65 feet in length, 40 feet wide, and 35 feet high, lighted by nine large windows; a gallery is provided to accommodate 70 persons, together with reporters, for whom a private room is arranged adjoining.

The reception-hall, dining-room, and mayor's parlor are shown on the first floor plan, and occupy nearly all the Pinstone Street frontage, the whole being arranged so as to form one grand room 138 feet in length, 38 feet wide, and 35 feet in height, the partitions dividing the rooms consisting of light iron framing with wainscot panelling, designed to run in concealed grooves across the corridor into spaces formed by the hollow walls of the entrance-hall, this being effected by hydraulic power. In connection with the dining-room are serving and cloak rooms, lift to kitchen and the extensive culinary department on the second floor. The whole of the pilasters and bases, forming bays to grand room, to be in faience; the chimney-piece of Carrara marble, with Devonshire marble shafts to columns, panels of the same material; the floor to be laid with 3-inch battens of English oak.

The following departments are on the second floor, viz., sewerage and rivers office, laboratory, store-rooms, additional offices and culinary department; on the first floor the town clerk's department, ante-room, six committee-rooms, mayoress's parlor and cloak-rooms.

The ground-floor is occupied by the borough surveyor's, accountant's, and waterworks departments, and the lower ground-floor by the health offices, weights and measures department, large room for electric-light installation, engine and boiler room, coal and other stores, and public lavatories facing Pinstone Street.

Separate lavatory accommodation is provided for each department, and is so placed as to allow of quick communication with the sewer, and at the same time allow for complete control by means of disconnecting and inspection chambers in the internal and external areas. The ventilation to be upon the plenum and vacuum system for the council-chamber and reception-hall; rooms for the exhaust propellers are provided in the roof, and for the fresh-air propellers in the basement. The ventilation proposed for the general offices is by foul-air extract flues, with inlets upon Tobin's system. The heating to be upon the low-pressure system with coils and radiators, private offices having fireplaces in addition.

Holmfirth stone was suggested for the whole of the façades with brick backing, patent Victoria stone for corridors and secondary staircases, with wood blocks to the former and teak treads and risers

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to the latter. The roofs, flats, and floors throughout to be formed of rolled-iron joists, and coke-breeze concrete the latter, with wood-block flooring.

The architectural treatment is Renaissance in character; the main façades are varied in outline by the introduction of pavilions at intervals, the clock-tower being at the northwest corner of the site, forming, as it were, the apex of a triangle with the adjoining church towers. Allegorical figures contribute to the adornment of the exterior. The basement to be rusticated; the ground-floor having columns and pilasters of the Ionic order, the upper story ornamented with those of the Corinthian order surmounted by an attic story, with a caryatid story at the southern pavilion. The estimated cost was 82,000*l.*

SHOPS AND DWELLING HOUSES, ST. LEONARDS-ON-SEA, ENG. MR. ARTHUR WELLS, ARCHITECT, HASTINGS, ENG.

THESE shops were recently erected at St. Leonards, at the junction of Warrior Gardens with Western Road. The premises comprise five separate buildings, and are so arranged that in each case the shops can be let, if so required, apart from the houses. The former have lavatory arrangements distinct from the dwellings, and also convenient cellars in the basement. The kitchen offices for the houses are on the first floor. The buildings were satisfactorily carried out at a total cost of 5,233*l.*

THE FELLOWS' GARDEN, EXETER COLLEGE, OXFORD, ENG.

AT the present time the drawings of picturesque scenes in Oxford, by Mr. Claude de Neuville, have excited much interest in the university and city. We give this week an illustration of one of the drawings, which will suggest the style of the artist and his success in catching the spirit of the place.

BOOKS AND PAPERS

SO many excellent books have been published during the last few years upon the subject of Construction, and the particular branches relating to trusses and roofs have been, on the whole, so thoroughly and successfully treated, that it is difficult to do justice to the clear and comprehensive manner in which Professor Merriman has handled the very trite topics of roofs and bridges in his work recently published by John Wiley & Sons.[1] It is avowedly a text-book and is written very manifestly for students, being consequently more exact and minute in its investigations than would be desirable in a work which was intended for the practising architect or engineer. There is no reason why the man of practice should not be as exact as the student who is engaged with merely theoretical problems; still as a matter of fact a great deal of the calculation which a college professor finds necessary is often skipped entirely, judgment and experience being applied to an intuitive solution of the problem; and this work is no exception to the general rule that few text-books are exactly suited for office work. The amount of necessary calculation which enters into the work of the architect or engineer can be generally expressed by a very few pages of theory; and in considering points which after all are matters of experience rather than theory, any further analytical elucidations, while necessary for the student, are simply encumbrances for the practical constructor. This should not be taken, however, as either a condemnation of the methods of analysis or of the arrangement of matter in this work, both of which are clear, concise, and admirably arranged for purposes of study.

The general subject is treated in two volumes. Or rather, one might say that the general subject is treated in two ways, the first volume being given entirely to analytical consideration of stresses in trusses, while the second volume takes up the graphical statics as applied to exactly the same problems, the arrangement being identical in each volume so that the two may be readily compared. The portion relating to the graphical statics is preceded by some very ingenious and valuable applications of the system, possibly not original with the author though we do not remember to have seen them published before in just this form. For instance, in the case of beams which are loaded at several points, or loaded unequally, the equilibrium polygon is used to determine the reaction on the supports and also to work out the vertical shears and the bending moments for all sections. The author does not make the application, but such a method is found very advantageous in determining the strength and proper sections for cast-iron bow girders, and for some forms is used quite frequently in practice. Another very clever application of graphical statics is made in a section designated as graphical arithmetic, multiplication, division, extraction of square root, determination of the reciprocal, and several applications being worked out in a very clear manner by graphical methods. In treating the determination of strains in a truss, the work follows very much the lines of Green's "*Graphical Analysis*," but is carried a little further in detail and is made exceedingly simple and practical in its applications. One feature which is often omitted from the calculations of the engineer is the determination of the action of the wind pressure on trusses with one end free and the other fixed. For such cases the author works out two strain diagrams, one in which the force of the wind acts wholly on the fixed side and the other with the entire wind pressure applied to the free side, calling attention to the fact that in a truss with fixed ends the reactions due to the wind pressure are inclined, giving rise to horizontal components which tend to overturn the walls of the building whereas in the case of a truss with one end fixed and the other free the reactions on the free end are vertical.

The work contains some ideas of very practical value, showing that the aim of the author is quite as much to make the students think for themselves as to formulate any system of calculations, and a great many very well chosen problems are added after each article which the student is to solve for himself, blank leaves being bound in with the text so that the solution of the problems can be finally incorporated in the volume by the student. A good definition of a truss is given as being a structure arranged to carry loads in such a manner that each principal member is subject only to stress in the direction of its length, that is, to a tensile or to a compressive strain, and the point is very wisely made that the investigation of a roof truss is a complex problem requiring great skill, judgment and experience, the computation of the stresses being the least difficult part. In the examination of a particular structure attention must be given to the joints and connections, since it often happens that these are weaker than the main members. In a wooden truss many joints have parts subject to shearing which need careful investigation on account of the resistance of timber to this stress. In iron trusses the riveted joints must be tested for the bearing compression as well as for shear and tension, while the pins are to be computed as well for bending as for shearing; and in any important case the student is advised to make a working-drawing showing all details, since thus the data as to dimensions are most clearly presented.

A very convenient formula is given for determining the weight of a truss.

Let l be the span in feet, a the distance in feet between adjacent trusses and W the approximate weight of one truss in pounds. Then

For wooden trusses $W = \frac{1}{2} al\,(1 + \frac{1}{10} l)$.

For wrought-iron trusses $W = \frac{3}{4} al\,(1 + \frac{1}{10} l)$.

It is very easy to criticise and find fault with any book, however well planned, but though written as we have said for students and necessarily pretty precise in the details, this work is more free from excresences and unnecessary elaboration than any that we know of at present before the public, and it is a great compliment to a professor of mathematics to say that he has been able to hold his subject so well in hand as to resist the temptation to wander off in the intricacies of analytical discussion which are so apt to render useless some of the best of reasoning and clearest of methods. It is one of the rare books which was written not because the author wanted to say something but because he had something to say.

[1] "*A Text-book on Roofs and Bridges;*" by Mansfield Merriman, Professor of Civil Engineering in the Lehigh University. New York: John Wiley & Sons.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A FORM FOR THE USE OF ARCHITECTS.

NEW YORK, N. Y., April 10, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — We send you herewith a form prepared in the belief that something of the sort is desirable for protection against misunderstandings between architect and client.

We are under the impression that a form somewhat similar to this that we submit was published by you four or five years ago, but we have been unable readily to refer to it. We publish this form, hoping to obtain an expression of opinion from some of the more prominent architects of the country, and to have it discussed or criticised by you. Yours truly, COMPACT.

NEW YORK, N. Y.—— 18 .

Mr. ——.

Dear Sir, — We submit herewith for your approval a statement of our understanding of the work which you wish us to undertake for you.

Description of work ——.

Dimensions of lot ——. Dimensions of building ——. Height of building ——. Number of stories.—— Location ——. Proposed cost ——. Remarks (mention character of exterior and interior finish, plumbing, heating, lighting, etc.) ——.

We propose to undertake the above work under the following conditions.

Our work and remuneration to be governed generally by the enclosed schedule of charges and professional practice of architects, which we request you to read carefully.

Our charge in your case will be —— per cent on the total cost of the work, and in addition to the same and such additional charges as are especially mentioned in the schedule, there will be the following:

All necessary surveys and measurements.

Expert advice when sanctioned or requested by you.

A clerk-of-the-works to be employed by us for you at a salary of about $—— per week.

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For difficult foundations, piling, special or constructive iron or other engineering works, 5 per cent additional on the cost of said works.

Preliminary estimate—To save you both time and possible cost of remodelling plans, should the building as designed exceed the appropriation, we suggest that an itemized estimate, approximating within 10 per cent of the actual cost of the completed work, be procured from our expert. His charge will be $——.

Should the above prove satisfactory, kindly sign and return the duplicate.

Yours truly, ——, Architects.

Approved.
(Clients' signature,) ——.

BOOKS ON SCHOOL-HOUSES.

Portland, Ore., April 5, 1890.

To the Editors of the American Architect: —

Dear Sirs, — Kindly oblige us of the address of the parties of whom we may obtain T. M. Clark's pamphlet and annual report of the Massachusetts Board of State Police, on school-house construction mentioned under the head of Books on School-houses, on page 207, of your issue of March 29. We have a work entitled Robson's "*School Architecture*" published by John Murray, London, England, and would like to know if it is the same as the Weales's Series mentioned by you.

Very respectfully yours, Williams & Williams.

[Robson's "*School Architecture*," your edition, is the same as the one referred to. The Report of the Massachusetts Board of State Police can probably be obtained by addressing the Secretary of the Board, at Boston. For the pamphlet by T. M. Clark, write to the Bureau of Education, Washington, D. C., asking for Circular of Information, No. 4, 1880, on Rural School Architecture. — Eds. American Architect].

BOOKS ON PLUMBING AND STEAM-HEATING.

Indianapolis, Ind., April 10, 1890.

To the Editors of the American Architect: —

Dear Sirs, — I wish to obtain a work on plumbing, which not only gives the theory but the practice of plumbing. A book that will enable me to design the system of plumbing for a large office building or hotel, also, on steam-heating. Am fairly well acquainted with the work in a general way and could design for an average flat, but have not the experience in good practice or knowledge of the principles, to take a large building and feel that I knew I was right.

If you could kindly give me the names of such works and their price, would be very much obliged. F. A. Sherrill.

[Bayles. "*House Drainage and Water Service*"; Philbrick. "*Defects in House Drainage*"; Putnam. "*Sanitary Plumbing*," and various other books, will be useful. For steam-heating, Baldwin's "*Steam-heating for Buildings*" is the best book we know. In plumbing matters, it must be remembered that the art advances so rapidly, that all books soon get antiquated, and fail to represent the best practice, or to describe the best appliances, and personal investigation and experience must supplement them. — Eds. American Architect.]

THE PROPOSED BRONZE DOORS FOR TRINITY CHURCH.

New York, N. Y., April 9, 1890.

To the Editors of the American Architect: —

Dear Sirs, — Will you be kind enough to act as referee on the following question? Will the bronze doors proposed for the Trinity Church, New York, be out of keeping with the strictly Gothic style of the church, because of the material used, or was brass and bronze used in the "Gothic Age?" In fact, would you limit a strict style, to the material used?

Respectfully yours, J. A. Hays.

[1. No. 2. Iron was used more generally than either brass or bronze. 3, No. — Eds. American Architect.]

A QUESTION OF COMPENSATION.

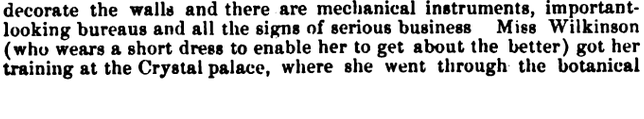
New York, N. Y., March 26, 1890.

To the Editors of the American Architect:

Dear Sirs, — When an architect is employed to make plans for a building and several other structures are erected also from the same drawings, should he not be paid for each building (that is for the plans) especially when he is employed to supervise all the buildings?

Yours truly, Architect.

[An architect should certainly be paid a reasonable price for all the professional work he does at another's request. What will be a reasonable price, depends upon all sorts of circumstances, and there is no rule now that we know of for determining by any arbitrary percentage the compensation of the architect for repetition of his design. The old provision of the New York schedule, that one per cent on cost should be charged for duplicates, was, we think, entirely disused long ago. — Eds. American Architect].



A Lady Landscape Gardener. — There is only one lady landscape gardener in London, Miss F. R. Wilkinson, a young lady of about thirty. Her office looks like that of a busy surveyor. Curves and squares decorate the walls and there are mechanical instruments, important-looking bureaus and all the signs of serious business Miss Wilkinson (who wears a short dress to enable her to get about the better) got her training at the Crystal palace, where she went through the botanical course and has now been a landscape gardener for five years. She has done a good deal of work in laying out public gardens, and is at present engaged on the lawn at Lambeth. She prefers private work, however. She has one pupil, a girl, and has had several applications from others. — *Pall Mall Budget.*

Some unexpected and rather surprising speculative features have been developed in financial, commercial and industrial circles within the past few days. Legitimate business interests regret the breaking out of this tendency, and fears are expressed in some quarters as to the probability of serious harm resulting. The iron trade, for instance, is now suffering from a prolonged depression as a result of speculation. A speculative movement in wheat has manifested itself, growing out of the low average condition of winter wheat and an alleged shortage in the Indian crop. In New York, last week, over 100,000,000 bushels of wheat were bought and sold, and a sharp advance in prices was the result. There is a speculative tendency shown in real-estate in several sections; also in certain lines of railway stocks, trust securities and industrial securities. No permanent damage may be done by this tendency, but its effect has been to develop an unusual degree of conservatism and to make bankers more cautious. All of the financial reports of the past few weeks, both in Eastern and Western markets, show that there is an abundance of money as yet; but, at the same time, the controlling financiers are holding a tight rein on the markets in view of possible dangers in the near future. What these dangers may be they do not state, but merely hint at. An urgent demand for money may arise, they say, and the present conditions of money and business are not favorable for any great expansion of loans. Articles in the financial columns of metropolitan daily papers, if read between the lines, corroborate the intimations thrown out by the leaders in finance. Business men generally need concern themselves but little with these ups and downs, ebbs and flows in the tide of financial affairs; but, at the same time, it would be well, for the present, for those business interests which expect to be large borrowers, to carefully watch the signs of the times, and avoid, as far as possible, being placed under the necessity of emergency borrowing. The silver question is the subject of careful study on the part of commercial bodies, and its importance is being more generally appreciated. The Secretary of the Treasury was expected to appear before the New York Chamber of Commerce a few days since, to explain and defend his position on the Silver Bullion Bill, but, from the fact of his declining the invitation, it is evident that he does not care to be catechised on the subject just at present. The reason is plain: A mighty Western influence is demanding the passage of this Bill; a very powerful Eastern influence is against it, or at least, powerful interests East are aiming to control and direct legislation in this matter. The gold standard is in imminent danger, not only in this country, but abroad; old-time theories on the question are likely to be upset. The possibility that a Bill will pass, providing for the purchase of $5,000,000 worth of silver bullion per month, has lately given Eastern financiers something to think about. It is possible, of course, that this legislation may be manipulated and side-tracked for a time; but the influences at work in every department of activity will compel a bold, radical and effective treatment of this vexed and vexing question before long. Trade conditions have improved during the past few days. Bank clearings show a decrease as compared to the corresponding week last year, but for the month of March, as well as for the first quarter of the year, clearings show a gratifying improvement as compared to 1889.

Freight-shipments over the trunk-lines both east and west of Chicago show a very great increase over the corresponding weeks of last year. The railroad interests are gratified at the improvement in the volume of business for the past three months, and the opinion is everywhere entertained that the business for the year will be greatly in excess of the volume for last year. As to new railroad construction, the only additional facts furnished by market reports are to the effect that a large amount of railway material is now under negotiation, and that large sales will probably be closed this month. Most of the new work is in the Southwest and West, but, in the aggregate, the railroad mileage in the States east of the Mississippi River will be much greater than for years past. The concentration of railroad management into fewer hands is progressing, and bringing about good results in the harmonizing of interests which have heretofore been hostile, and the gradual removal of hurtful competition. The railroad managers are gradually bringing comparative order out of confusion, but do not receive due credit for their achievements in this direction. In the hurry and flurry of daily writing upon current events, editors are to apt to overlook the real progress that is being made, and give prominence to sensational announcements which are frequently of a damaging character. Our railway managers are developing a degree of ability in the management of difficult and intricate railway problems which entitles them to respect and confidence. If Congress will give the railway managers time, and the assistance to which they are entitled, there will be less occasion for the appointment of railway commissions and the enactment of cast-iron railway legislation in the not distant future. Great activity prevails in all of the leading industries. Although the pig-iron makers have been frightened into restricting production to the extent of about 5,000 tons per week, prices are likely to react, in which case a full output will be resumed. Large buyers of all kinds of iron and steel are holding off for the present, regarding prices as still unsettled. The railway builders are watching to see if rails will not drop to $33 before paying $34 in Eastern and $35 in Western markets. The bridge-builders and car-builders have been rather cautious buyers ever since the opening of the year, but as prices have within a week or two past reached cost limits, a heavy demand will soon set in, or all the signs are wrong. Southern pig-iron makers are responsible for the break in Northern iron prices, having hurried in rather rash offers of large quantities of crude iron at cut rates. The lumber trade has gained considerably within the past ten days, because of the action of wholesalers, retailers and builders, who see that lumber quotations are now at their lowest for the season. The mining interests in the West are active, but the anthracite coal producers are still limiting their output to about 500,000 tons per week. Hardware manufacturers are running full time East and West. Paper manufacturers are endeavoring to restrict production, but, although market conditions show the wisdom of this course, the fact does not prevent the projection of new mills or the enlargement of old ones. The makers of tools, small engines and light machinery of every description are particularly busy. Throughout the agricultural regions of the West and South, the low prices at which products have been selling does not seem to have caused any particular depression in industry.

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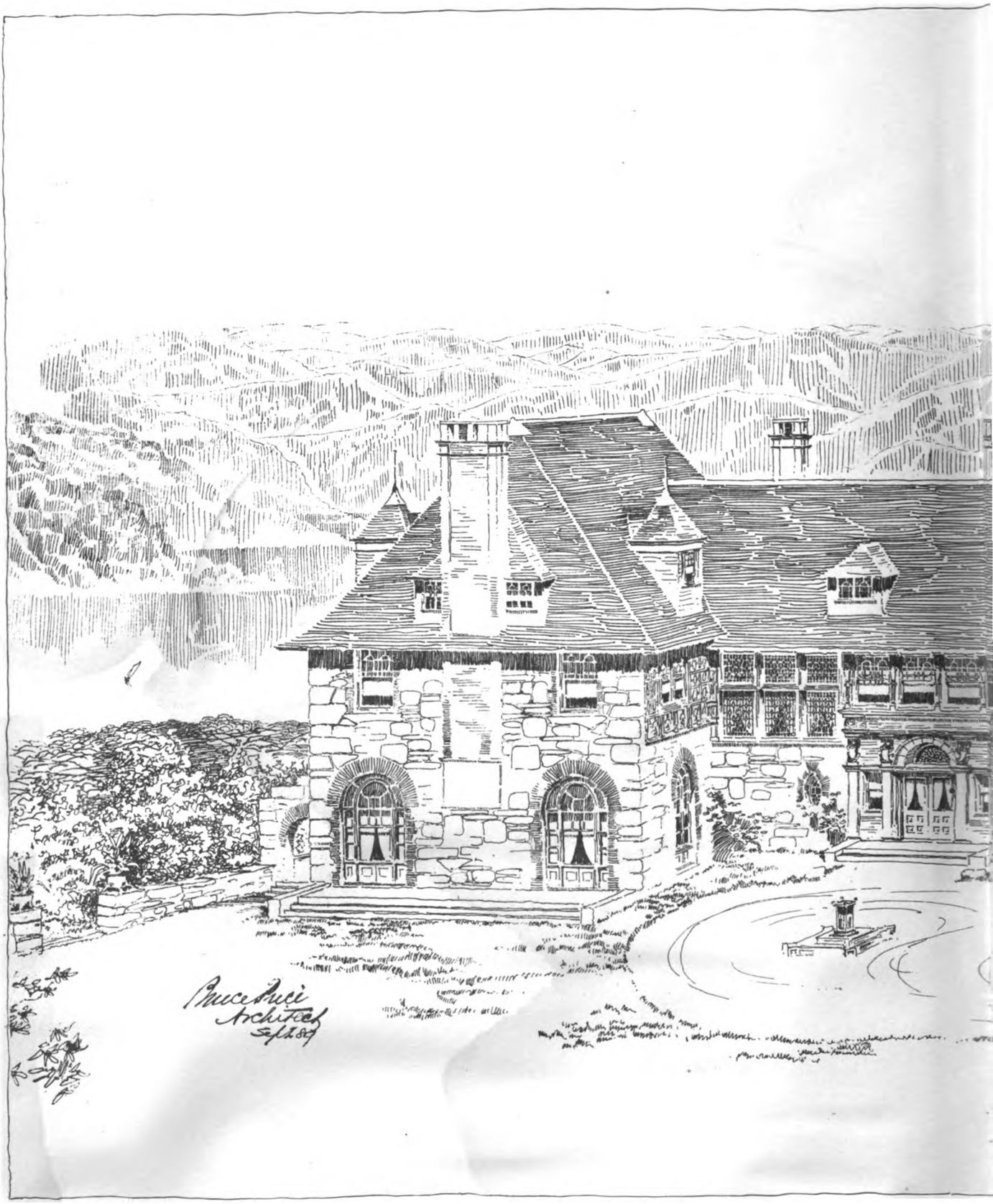

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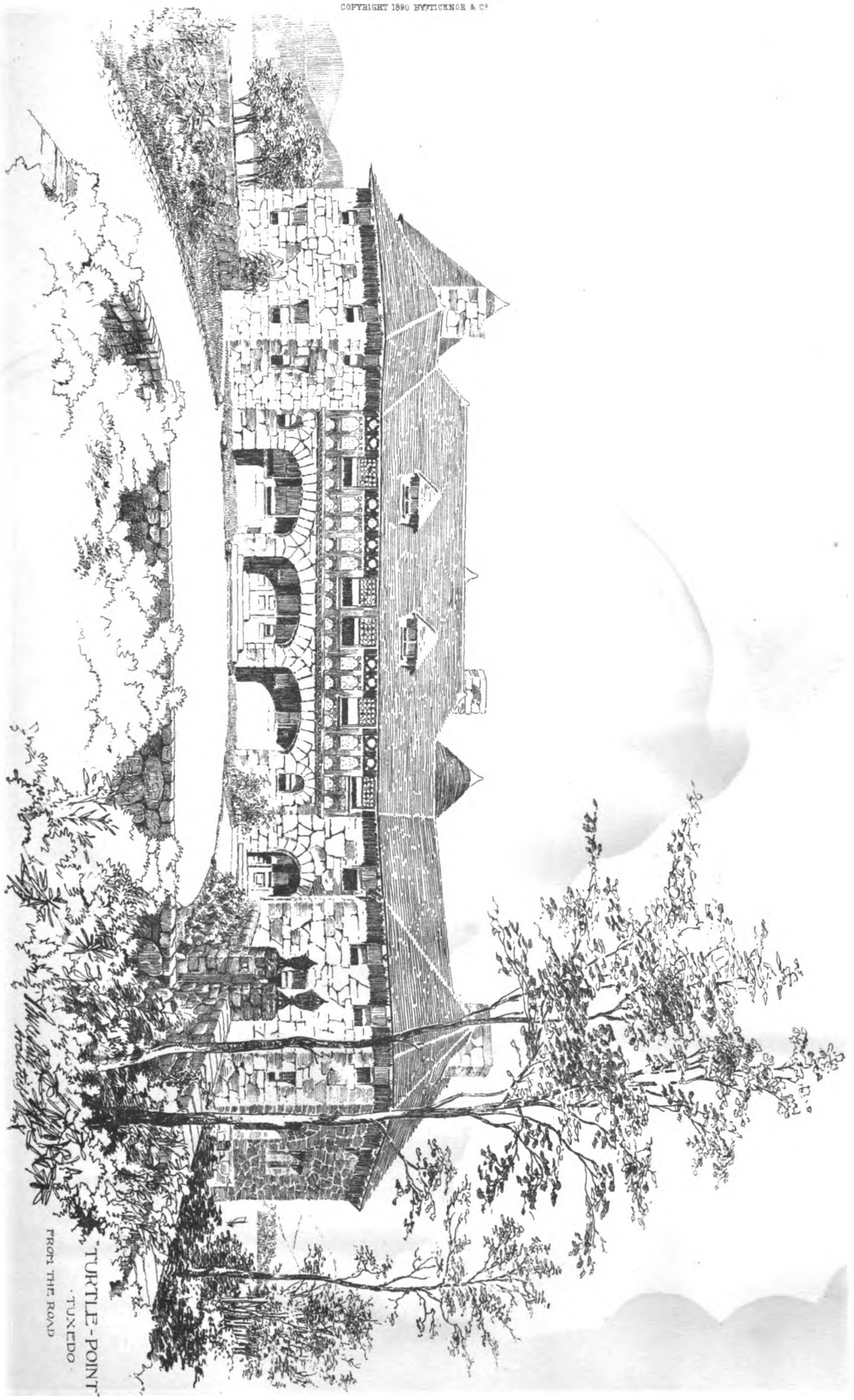

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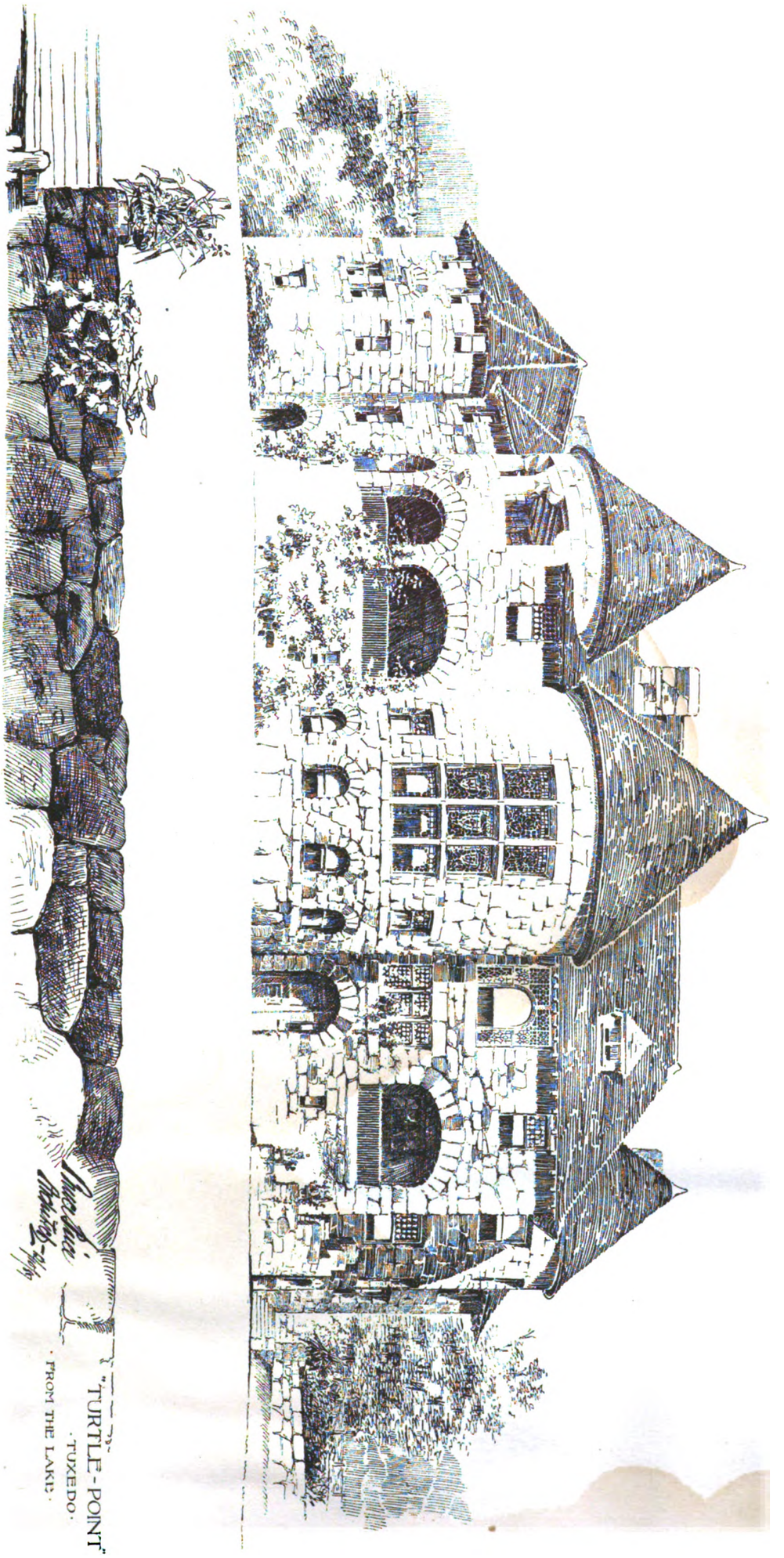

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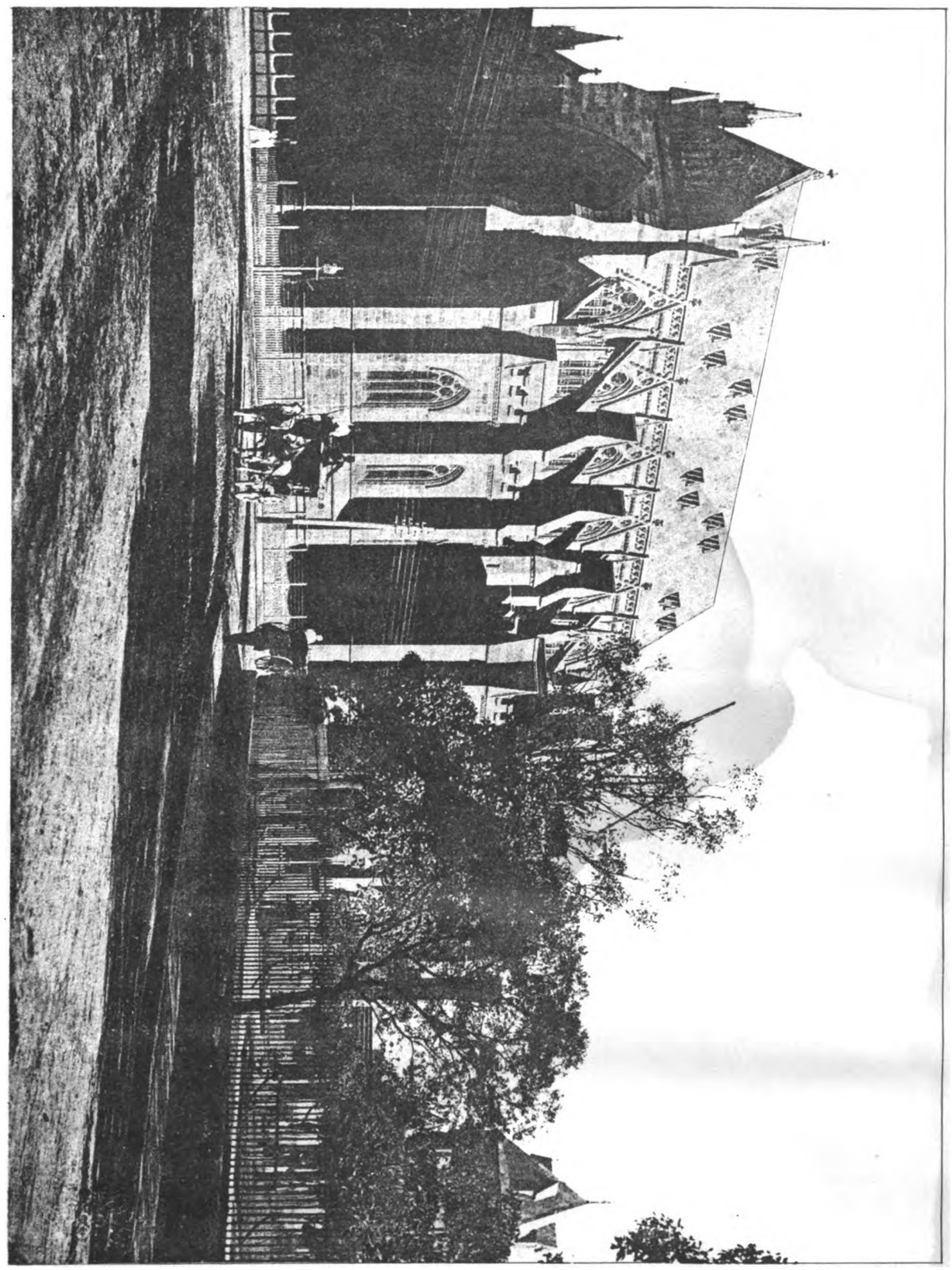

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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APRIL 26, 1890.

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THE labor troubles still continue, with all the fury that the people whose living depends on agitation can contrive to give them; but within the last few days some complications have arisen, through the appearance of two or more rival walking-delegates as directors of the same strike. Not long ago a mischance of this sort occurred in Boston. The most conspicuous building, perhaps, in process of erection there is the Ames Building, on the corner of Court and Washington Streets, which is to be eleven stories high, and is under contract to be finished within a very short time. This conjunction of circumstances is just what most tempts the agitators, who can most effectually annoy those contractors that are strictly limited as to time of completion, and who get most free advertising in the newspapers by making a large and conspicuous new building the scene of their attacks. Hence it came about that one morning two or three elegantly-dressed persons appeared at the building, and informed the men that they were a committee, appointed by the Union for the purpose of ordering a strike, and that, in virtue of this authority, they commanded the men to lay down their tools at once, and leave their work. The men, with their usual docility, immediately obeyed, and the elegant delegates departed. An hour or two later, however, they reappeared, and, without any explanations or circumlocution, ordered the men to go back to work, which they did, as meekly as they had left it a little while before. Two or three hours more elapsed, when the familiar form of the regular walking-delegate of the Union came blustering up the ladders. He gathered the men together, and informed them that the committee which had previously visited them had no authority to order or countermand any strikes, and that he alone was the person to be obeyed. He seemed to be uncertain whether to test his influence by ordering another strike on the spot, and the men did not encourage him, but went on with their work, which they will probably pursue until the rival magnates have settled between themselves which shall remain in possession of the field.

ANOTHER circumstance has somewhat clouded the prospect of the immediate alliance of all workingmen for the subjugation of capitalists. The squabbling incident to the stone-cutters' strike in New England has brought out the fact that the association of the Knights of Labor, that mighty organization before which the would-be Governors of Massachusetts abjectly bowed the knee two or three years ago, has fallen into very low esteem among the building trades. Not only are the Knights of Labor "cards," about which as much talk was made not long ago as if they were passports to Paradise, refused recognition in nearly all Union shops, and on buildings where Union men are employed; but at least one of the unions, which admits ordinary mortals as members on payment of one dollar entrance fee, will not receive any Knight of Labor, unless he pays an entrance fee of ten dollars. Why this discrimination should be made against the members of an organization which, according to Mr. Powderly and his friends, comprised very recently most of the virtue and intelligence of the country, we are not informed, but we imagine that the "practical politicians" could furnish an explanation, if they wished.

A BILL has been introduced into the New York Legislature to appoint the present Superintendent of the New Capitol Building, Mr. Perry, architect to the State, at a salary of ten thousand dollars, and to give him charge of all building projects for the State Government. Practically, Mr. Perry, who is an able and experienced man, has done a very large part of the State building work for several years, as his position on the Capitol naturally made him the first to be called upon by members of the Legislature in relation to such projects, and his salary in the new position would probably be less than the sum of his salary for his work on the Capitol, added to the commissions which he has drawn for other professional service to the State; but there is no question of the disadvantage, in many ways, of committing all State work to one architect, and the New York Chapter of the American Institute of Architects has very properly protested against the proposed bill, on grounds which are familiar to the profession, such as the excessive expense of professional work done in this way, which, as abundant experience has shown, costs more than the fees of regular architects for the same service; the inferior quality of the work; and the corruption and scandal which almost always gather around an office where so much patronage is dispensed, and where the expenditure of so much money is controlled. The Chapter, in its protest, makes a suggestion, which is new and valuable, proposing that, instead of an official architect, an official building-committee shall be appointed, consisting of three architects and two State officers, who shall be paid for their service, and act for the State in the same way that a building-committee acts for a private corporation. Something of the kind has already been tried in Massachusetts, where the State-House Extension, and the Suffolk County Court-House are being constructed by Commissioners, to whom the State and County delegate the proper authority, and who devote themselves most energetically and successfully to the task of getting the best work possible for the State, at the smallest expense.

THE subject of the value of certain portions of an architect's work was brought up recently in the New York Chapter of the American Institute of Architects, by a paper from Mr. Bloor, reporting an award made by him in the case of claims made on an insurance company by a firm of architects, for the loss of drawings and papers. The most interesting part of the award was upon a claim for four thousand dollars for "sketches" of a proposed hotel, intended to cost four hundred thousand dollars. The "sketches" consisted of two elevations, "a pen drawing of elevation," by which we suppose must be meant a perspective drawing, a second-floor plan, and an alternative second-floor plan. The amount claimed was obviously one per cent on the proposed cost, the usual schedule rate for "preliminary sketches" of such buildings. It seems that there was another referee, who agreed with Mr. Bloor as to the value of all the other items on the list of lost property, but demurred to this, and Mr. Bloor, in his paper, considers very clearly the arguments on both sides. That one per cent on the proposed cost is a fair remuneration to an architect for preliminary sketches of an important building we suppose would be generally conceded. Mr. Bloor says that "the courts agree that one per cent is a proper and customary charge for such professional labor and product as is covered by this item"; a statement which certainly needs qualification, as courts are generally reluctant to admit even the five per cent rule as a "custom," legally binding on people in general, and we never yet heard of a court in which the schedule subdivisions were accepted as "customary," although the *amounts*

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derived from calculations in accordance with these subdivisions might be, and probably would be, in most cases, regarded by a jury, when presented as lump sums, as reasonable and "proper" remuneration for professional service, carried to the points indicated by the schedule.

WHETHER the value of such drawings, to be collected from an insurance company in case of loss, is the same as the proper charge to the client for the incomplete service, is, however, a different question. Evidently, the architect who makes preliminary sketches earns his compensation more through the time, thought, experience and skill involved in fixing upon the outlines of a suitable scheme than by the comparatively trifling labor of making the drawings required to show the project upon which he finally determines, and, while it is perfectly fair that the client should pay the architect what this skill and thought is worth, an insurance company may say that as the architect would naturally retain in his memory more or less of the results of the mental processes he has gone through, he will need only a comparatively short time to reproduce the lost sketches, and that the claim on the company should be only for the time needed to make the duplicates. Mr. Bloor, in considering this point, says, with great reason, that "for an architect, whose creative faculties are kept constantly on the stretch for current purposes, to tax his memory in picking up constructional and artistic threads which he has long before dropped, as he supposed, for good, would be a most irksome, if not impossible, and certainly a very self-disappointing task, which he would in all likelihood speedly forego for the more satisfactory one — from the designer's point-of-view, even if unsatisfactory in other relations — of elaborating the whole scheme *de novo*, without reference to any antecedent processes"; but, to make all reasonable allowance for the probable value of the architect's recollection of his work, he advises the deduction of a thousand dollars from the claim, making the amount due from the insurers for the lost sketches three thousand dollars, instead of four thousand.

SATAN, always intelligent and inventive, has devised another scheme for the annoyance of architects. Many of our readers have doubtless received lately an official-looking envelope, with the legend printed in the corner, "If not delivered in five days, send to American Institute of Architects, 18 Broadway, New York," the "send to" being printed in very small letters. We suppose that most of the architects who received the envelope opened it with the respect due to an official communication, imagining that it must contain a notice of election to membership, or an appointment for a committee meeting, or some other important matter, and were by no means pleasantly surprised to find within a circular describing the goods of a radiator manufactory. We must confess that, although it did not escape our notice that the source of official communications from the American Institute of Architects is no longer New York, but Chicago, we were so much impressed with the importance of giving due attention to the communication, whatever it might be, that, on finding in our hands a radiator circular, we thought we must have opened the wrong envelope, and had to search the waste-paper heap before we found the envelope, and discovered the trick which had been played upon us. What might have been our feelings on the subject it is not necessary to mention, but as we received the next morning an indignant letter from a correspondent, enclosing the papers, and calling our attention to the "outrageous" manner in which he had been deluded into opening the circular, we suppose that there were others who felt themselves imposed upon. Of course, the scheme was not a very wicked one, and it was certainly ingenious; but, as we have often said, architects are peculiarly impatient of having the limited time during which they can give their personal attention to the business of the office encroached upon by bores, either in human form or enclosed in envelopes. Those that appear in the latter shape can generally be recognized and swept into the waste-basket unopened, and the surreptitious insinuation of one into the architect's attention, under the disguise of an important professional document, is nearly as annoying as to have an electric-wiring contractor or a stained-glass drummer mistaken for a client, and introduced into the private office. The authors of the device also, we believe, lose, rather than gain, by its success. First impressions are of great importance in business matters, and to have one's name connected with even a petty annoyance like this is far from possessing the key to the good graces of architects.

A RATHER singular strike, which was happily of short duration, took place last week in New York. Messrs. Paulsen & Eger, proprietors of the Hecla Iron Works, some time ago had a quarrel with the Unions, the result of which was that they were defeated, and signed an agreement to maintain their factory as a Union establishment, and to allow free admission to walking-delegates. A rather lively discussion took place on this occasion, and one of the delegates called one of the firm a liar. A few days ago, a story was circulated to the effect that Messrs. Paulsen & Eger were not paying their men the Union wages, and that some of them were working more than nine hours a day. Two walking-delegates were deputed to inquire into the truth of the rumor, and, with the characteristic insolence of the Unions, the man who had called Mr. Paulsen a liar was sent as one of the delegates. When the two deputies appeared, Mr. Paulsen refused to allow this man to enter the shop, but said that the other delegate might go wherever he wished. The latter refused to go anywhere without the first, and the two then retired, and reported to the Board of Delegates that "the rumor was confirmed." The sole foundation for this assertion appears to have been the fact that Mr. Paulsen refused to have a man make inquiries in his shop who could not treat him with decent courtesy; but this made no difference in the result, and the firm was immediately "struck." In all the important buildings where their men were at work, or wherever goods from their factory were being used, all the carpenters, masons, painters, plasterers and other workmen were ordered to drop their tools and stand idle until Paulsen & Eger's men and goods were excluded from the building. The contractors promptly surrendered to the walking-delegates, and, on the expulsion of everything flavored with Paulsen & Eger from the buildings, work not connected with them was resumed. A few days later, however, Messrs. Paulsen & Eger sent word that the impertinent delegate might go through their factory if he wished, and peace immediately reigned again, to the great relief of the contractors and building owners, to say nothing of some fourteen hundred men, who had remained idle for a day at the order of the delegates, and who, if the latter could not have vindicated their personal importance otherwise, might have been kept out of work for months.

A NOVEL engineering device was used a few days ago in the repairs on the Hudson River Tunnel. As the newspapers have already reported, a workman, two or three weeks ago, descended into the air-lock with a candle, with which he searched for leaks along the seams of the wooden caisson. The seams were caulked with oakum, and, perhaps aided by the increased chemical action of the compressed air, this, as well as the pitch from the timbers, caught fire. The alarm was immediately given, and the workmen escaped; but in a few minutes holes were burnt in the woodwork, through which the water poured, soon filling the caisson. On trying to pump out the caisson, it was found that the water came in faster than the pump could remove it. Divers were sent in, who searched in vain for the openings, and succeeded only in shutting one of the doors of the air-lock, which the workmen had left open on their escape. The engineer in charge then adopted a new plan. Instead of pumping the water out, he pumped air into the caisson. The air, of course, escaped through the leaks, but he meanwhile procured a number of rats, and tied a bunch of oakum by a wire to the tail of each. The rats were then, one by one, put into the air-pumps, and forced through the valves into the caisson. Of course, their first object was to escape, and, following by instinct the stream of air-bubbles which issued from the leaks, they made for these orifices, and struggled through them into the river outside. On the way, however, the bunches of oakum which had been tied to their tails caught in the crevice, and were pulled off, wedging themselves tightly in the opening. After a sufficient number of rats had been sent out in this way, the leaks were found to be so far stopped by the oakum which they carried that the air-pumps could gain on the water, and it was then an easy matter to complete the caulking, so that the pumping-out of the water could go on properly. As soon as the water is out the excavation of the tunnel will be resumed, and the delay will probably not be very serious.

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RELIGIOUS ARCHITECTURE.[1] — III.

I. RELIGIOUS ARCHITECTURE OF ANTIQUITY. — EGYPT.

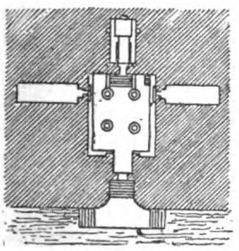

Fig. 15. Plan of the Speos of Addah (16th Century B. C. .

SUCH were the edifices of the great Theban period, constructed on a type which seems to have been preserved in almost absolute integrity. If we leave the neighborhood of Thebes and pass into Upper Egypt, we find the temples completely changed in external appearance. The question at once arises whether there was a like modification in the general plan-dispositions, and whether the Egyptians, on entering new regions, thought themselves compelled to abandon former traditions and adopt entirely different customs.

The temples to which we refer are generally contemporaneous with the eighteenth dynasty, rarely with the nineteenth; they are, then, at least as ancient as the edifices of Upper Egypt. But the chief difference which at once impresses the eye is that they are cut, wholly or in great part, into the rock. This mode of construction is ordinary ascribed to the precarious nature of the conquests made in the direction of Ethiopia by the Egyptian sovereigns, and to the necessity of rendering all such structures as little exposed as possible to attacks and injuries on the part of poorly subjugated tribes.

The speos, which is wholly underground, presents very similar dispositions at Addah, (Figures 15, 16) and at Feraïg, at Gebel Barkal, at Bayt-el-Waly, etc. The most casual examination furnishes an answer to the question asked above.

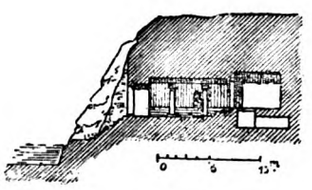

Fig. 16. Section of Speos of Addah. After Horeau.

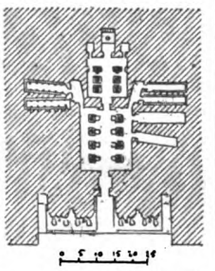

Fig. 17. Plan of the Temple of Ipsamboul. After Horeau.

On a small scale and reduced to their most elementary forms, these constructions faithfully reproduce the arrangements adopted for the temples of Lower Egypt; sometimes the *pronaos* is briefly indicated at the entrance, sometimes it extends quite deeply into the interior of the mountain; the hypostyle hall is always found beyond, though it may be diminished to a room of moderate dimensions, with only two

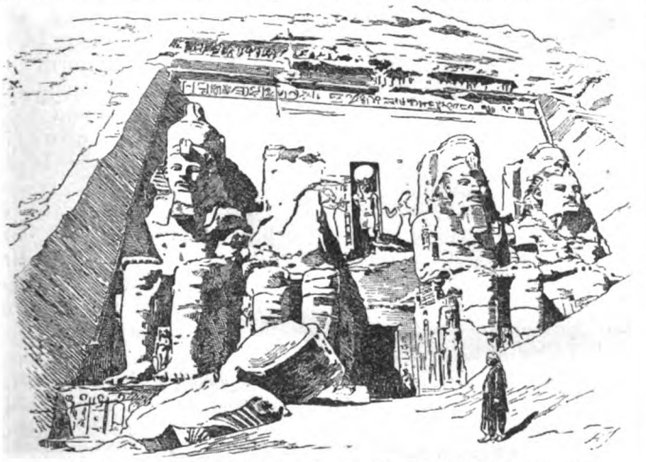

Fig. 18. Façade of Great Temple, Ipsamboul (15th Century B.C.).

columns. Behind, and cut entirely in the rock, is the sanctuary-chamber, with its subsidiary chamber constituting a rudimentary *opisthodomus*.

The great and small temple of Ipsamboul belong to this type; they are especially characteristic from the colossi at the entrance (Figures 17, 18), which seem to take the place here of the pylons designed, in ordinary temples, to proclaim afar the grandeur and the majesty of the place.

In the hemi-speos, as at Derri, Wady Sabooah and Gerf Hosayn (Figure 19), the *secos* is subterranean; the hypostyle

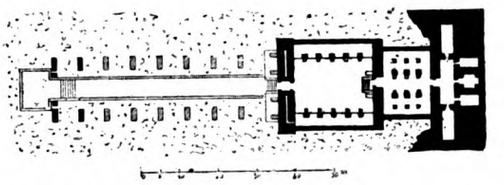

Fig. 19. Plan of the Temple of Gerf Hosayn (15th Century B. C.). After Prisse.

hall is sometimes cut into the rock and sometimes it is external; the fore-court is generally out in the open air.

The temple of Dayr-el-Baharee, near Thebes, restored by M. Brune (Figure 20), is the only known example of a temple wherein the fundamental dispositions are essentially modified. It belongs to the eighteenth dynasty. A sphinx alley, constituting the *dromos*, leads up to the entrance. There are three successive terraces one above the other; the *secos*, which consists

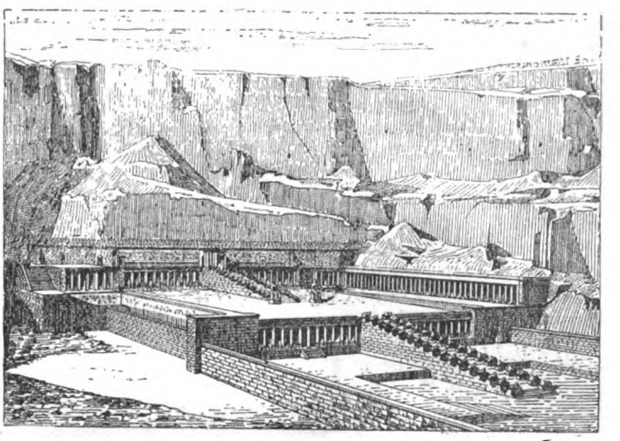

Fig. 20. Temple of Dayr-el-Baharee (15th Century B. C.). After M. Brune.

merely of a Holy of Holies, with a few small subsidiary rooms, alone remains underground; the rock has been cleared away everywhere else to make place for the broad terraces preceding this sanctuary. It is difficult to account for the peculiarity of this construction; Ebers[2] has attempted the following explanation: "Is it, in fact, a matter of chance," he asks, "that the step-temple of Dayr-el-Baharee was erected only a short time after the date when, under Thothmes, an Egyptian army first trod the soil of Mesopotamia and saw there, in the chief cities, edifices built in terraces? The Egyptians so delighted in repeating themselves that they lost the art of devising new forms, and why should they not have imitated from elsewhere this imposing monument, unless, perchance, it would have recalled the foreigner to them, and would, consequently, have been repugnant to them?" It is, in fact, possible that the aspect of the Assyrian monumental structures had, at some moment, impressed the imagination of the Egyptians, and that they had been led to copy in one of their edifices a part of one of these foreign designs; such an isolated attempt would not be apt to find imitators, in view of the mental characteristics of this eminently religious, tradition-enslaved nation.

Beside the temples which have just been described, there existed a certain number of much smaller edifices, dating from the eighteenth dynasty down to the reigns of the Ptolemaic sovereigns: "These were, as we have said,[3] chapels erected in honor of some local divinity or designed to recall, in an isolated spot, the passage of a conqueror and the homage which he had there rendered to the god who protected him and gave him the victory."

The plan of these chapels is the same as that which we shall find constantly recurring in Greece, that is, a cella, or naos, walled in, and surrounded by a portico. A short *dromos* preceded the entrance. The first of these to be described was one on the island of Elephantine (Figures 21, 22); this was at the time of the Egyptian expedition and it has since disappeared.

[1] From the French of P. Planat, in Planat's "*Encylopédie de l'Architecture et de la Construction.*" Continued from page 38, No. 747.

[2] "*From Cairo to Philæ.*"

[3] Perrot et Chipiez. "*Histoire de l'art dans l'antiquité: l'Egypte.*"

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A portico of two columns accompanied both the anterior and posterior entrances; there were antæ at the angles, and on the sides the columns were replaced by square pillars. The substructure and flight of steps recall antique Grecian dispositions, and it has often been said that the origin of the peripteral

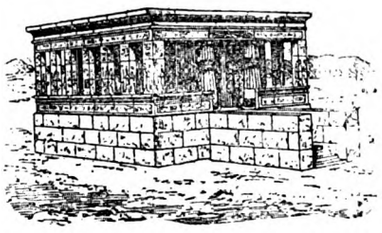

Fig. 21. Temple at Elephantine (16th Century B. C.). *Description de l'Egypte.*

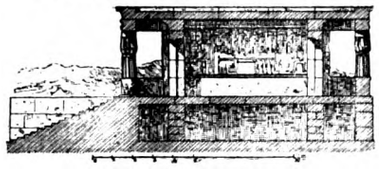

Fig. 22. Section of the Temple at Elephantine. *Description de l'Egypte.*

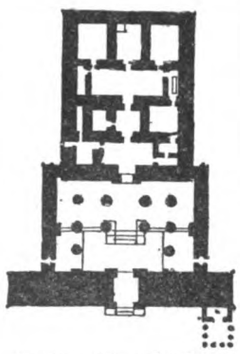

Fig. 23. Plan of the Temple of Philæ. After Ebers.

temple of Greece is to be sought in the temple of Elephantine. We leave the reader to judge of the likenesses and differences in them, which can easily be established.

Similar edifices exist at Semneh in Nubia and at El-Kab.

It remains for us, finally, to speak of the small temple (Figures 23, 24) on the island of Philæ, known as the temple of Isis. It is almost contemporaneous with the conquest of Egypt by the Greeks. Erected so near a period of complete transformation, it is not to be wondered at that it has none of the primitive dispositions of the Egyptian religious edifice; moreover, notwithstanding its name, the destination of the structure is not determined with any great certainty. "According to all the plans which have been given of it,[1] there could have been but one hall in it, or rather a rectangular court bounded by fourteen columns, with a low, richly decorated wall, forming a sort of screen in the lower part of the intercolumniations; in the upper portion, the spaces between the columns are open more than half the way, and there was never any roof." Some archæologists, considering the proximity of the stream and the presence of broad flights of steps leading down to it, are inclined to think that the temple of Philæ was a mere waiting-room.

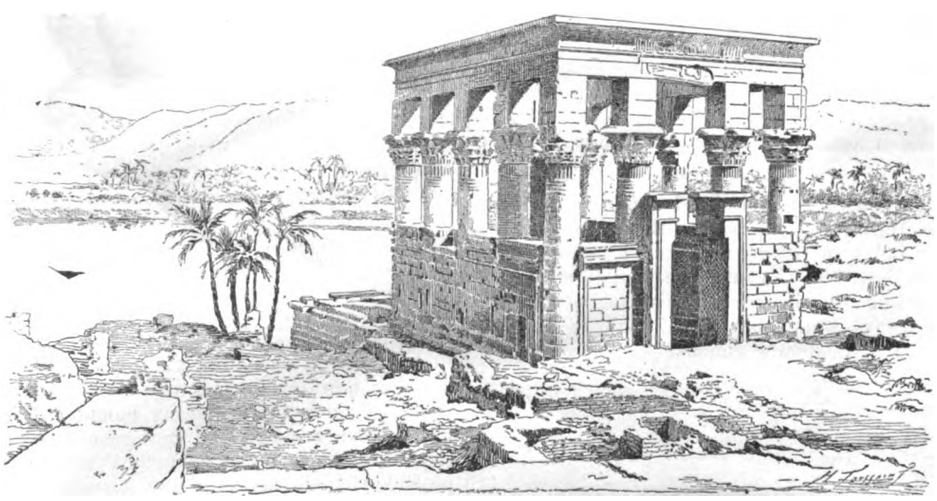

Fig. 24. Temple of Philæ (4th Century B. C.).

Without going into the details which do not properly come within the range of this general sketch, we will briefly indicate the building materials used by the Egyptians, and the peculiarities of their constructional system.

Granite, sandstone and limestone, with alabaster for facings, were generally employed in large edifices; all works of minor importance were built of either burnt or unburnt brick. In great structures the courses are carefully horizontal; the upright joints are not always vertical. The Egyptians also often made use of rubble-work between two faces of cut-stone.

The chief problem presented to the architect, namely, to cover vacant spaces, was solved by them in the simplest, if not the least costly, manner. They early adopted the plan of erecting at intervals pillars, and, afterward, columns, which were connected by beams or lintels, and these were in their turn covered by paving-slabs. When vast spaces had to be spanned, these stones were necessarily of enormous size and great weight; but building material of all dimensions was at hand, and there was no need to economize in manual labor, as is proved by the number of workmen represented on the bas-reliefs. The mechanical means in use appear to have been very simple, consisting of the lever and perhaps a rude crane. In general, the results, which still seem to us amazing, were obtained by the employment of men in extraordinary numbers; the wedge and roller were almost their sole aids.

The vault, with all forms of intrados — surbased, surmounted, semicircular and triangular — was, however, known to them. With heavy material, the vaulting was effected by means of corbelled courses. This sort of false vault offered no serious resistance, a fact recognized by the Egyptians, for they seldom made use of it except where two strong girders, buttressed against each other, formed above it a kind of discharging arch.

They built vaults with unhewn stones, which approached more nearly to the correct construction; they used small, roughly rectangular stones for these, introducing wedges to make up for the obliquity of the joints. The key-stone alone seems to have been voussoired. This imperfect construction must, of course, have been confined to minor uses.

With brick, on the contrary, which was easily moulded, the Egyptians constructed vaulting that left no room for criticism; the joints were convergent. When the superincumbent weight so required, successive beds were regularly laid one above the other.

It was, therefore, in no way through ignorance or incapacity that they employed the vault so little in important works; but the fact must be recognized that they did not know how to use it with any suitable assurance of stability and permanence, except on condition of building with small material. In vast structures, for which they hoped to realize an almost eternal durability, and which, moreover, admitted of a solemnity of aspect impossible to produce with brick alone, it was, therefore, perfectly natural that they should construct with ponderous material massively put together, and for this the proper form was the pillar and beam.

Mariette has, moreover, observed that the vault bears in itself a germ of death, since it thrusts and toils continuously; while the beam or lintel represents everlasting stability. There is, indeed, a grain of truth in this remark, but too much importance should not be attached to it; stability is just as much of a reality in a well-proportioned vault as in an architrave; its permanence is just as well assured. If one cares to examine the matter, he easily perceives that materials work in a vault under at least as rational conditions as in trabeated constructions, and that they wear out less, perhaps, since the kind of toil imposed upon them, namely, compression, is more in harmony with the kind of resistance which they are capable of offering than flexion is.

Mariette also sets forth the opinion that the vault possessed a symbolical character among the Egyptians: "that it represented the nocturnal vault of the sky, of the sky of Amenti." It was for that reason that the Egyptians reserved it for their funerary architecture. It is true that symbolism was carried to great lengths in Egypt, but, if Mariette's conclusions were right in this matter, we should expect to find all Egyptian tombs with vaulted ceilings. This is not the case, however;

[1] Perrot et Chipiez. "*Histoire de l'art dans l'antiquité: l'Egypte.*"

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in the same necropolis the roofings are sometimes flat and sometimes vaulted. And, again, the vault, if thus symbolical, would have been reserved exclusively for cemeteries, which is not the fact either; it occurs likewise in the subsidiary structures of palaces and temples. The only legitimate conclusion left for us is that the Egyptians relegated the use of the vault to constructions of minor importance, as they employed only small material in building it.

As regards architectural decoration in Egypt, we have little new to add to all that has been previously written about it. Here, as in all other countries of the sun, color is, we may say, a necessity. The white tone of stone is almost painful under the burning rays of the sun; white may be employed outside to repel light and heat in an ordinary passageway, but it would be intolerable on interior walls, which are constantly under the eyes. In their bright, transparent shadows, which, with us, would be dull and wholly ineffective, color plays such a splendid rôle that its use can never be neglected in Southern countries. The Egyptians, like the Assyrians, Greeks, Persians and Arabs, made liberal use of it, and it was all the more a necessary part of their decoration, because of the extremely sober character of other ornamentations.

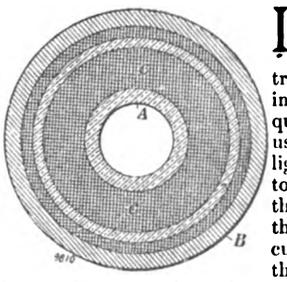
The vast surfaces of the pylons and of the great, naked, unbroken walls were adorned with occasional mouldings, including the characteristic cavetto, the fillet, the torus and a few channellings. The vegetable world supplied a few ornamental forms, as palm-leaves and lotus-buds; decorative *fauna* was called into requisition; geometric figures furnished curves, volutes and various patterns of scroll-work, which have been perpetuated from age to age. These slightly varied though elegant ornamental elements would have been inadequate for the embellishment of such extensive surfaces. Egyptian art devoted itself especially to the reproduction of purely human scenes, and these were multiplied indefinitely.

It has often been said that the Egyptians were an eminently materialistic people in the better acceptation of the word. They dwelt but little on mystical conceptions, and less still on the mysteries of the beyond. They were satisfied to see accurately and to seize rapidly, under characteristic lineaments, the present and real world around them. Man interested them more than all else in creation. In more than one way, and especially in this last peculiarity, Greece may be said to have fallen heir to the patrimony of Egypt. The differences between the two nations in this respect are, however, important. The Egyptian was content to *summarize* the physiognomy, or what is called the character of an object, in a simple stroke of extreme precision, which took in only the salient points. The Greek went farther; he expressed everything, but subordinated the secondary element, keeping it within its own sphere, and never allowing it to come into conflict with what should remain predominant. The Greek had a very keen perception of perfection; that is to say, the perfect harmony of *ensemble* and details, without ever departing from nature and truth. The native instinct of elegance was equally pronounced in both peoples. Both possessed the same delicacy and keenness, and as the Egyptians were the first to spring out of barbarism and attain a brilliant civilization, of which we still have only a very incomplete notion, we may naturally suppose that they would have been the first to reach the loftiest summits of art, had not their devotion to tradition definitely arrested the development of their admirable qualities. Unfortunately for them, when once an extremely pure and already very beautiful type had been created, they held to it, and, owing to their unparalleled veneration for the past, they fell into what may be termed official repetition, which made all fresh effort, all search after greater perfection, all subsequent progress, impossible.

[To be continued.]

STATUARY. — Statuary is to be employed as an element in the decoration of the Panthéon in Paris. The first works of the kind that have been commissioned are statues of Victor Hugo and Mirabeau. The models have been submitted to the committee. M. Injalbert has represented Mirabeau in an attitude as if thundering against the evils of Monarchical Government. Behind him is a figure that is to be taken as the Genius of Eloquence. M. Rodin shows Victor Hugo seated on a rock, and in that way recalls the poet's exile. His head rests on one hand, and the other is extended as if towards France. Behind are figures of women, who represent the various sorts of literature which occupied the poet, but from their attitudes they are likely to be considered as more suggestive of the Three Graces. — *The Architect.*

THE DANGERS OF ELECTRIC-LIGHTING.[1] — II.



IN order to use the electrical current two mains or conductors are required, an out-main, from the central station, and a home-main (and one intermediate or third main is also required where the three-wire system is used), and each lamp that has to be lighted has one end of the filament joined to the one main (say the out-main) and the other end to the other main (say the home-main), the passage of the current from one main to the other, through the carbon filament, causing ing the filament to incandesce, and to give light. Now, if the mains from the central station are constructed with one tube of copper within another, and with insolation between, as shown in the figure, the central ring, marked *A*, being the out-main, say, and the outer ring, *B*, being the return or home main, the shaded part between the two being the insulation, the only leakage of current that can ever take place is, say, from *A* to *B*, if there is any defect in *C*, and the current returns to the station through the leak by *B*, without passing through a lamp, or doing any work, and if the leak is so serious between *A* and *B* that it causes a larger quantity to go back to the station than the bridge there will stand, the bridge melts before any damage is done to *A* or *B*; and if another main or wire actually comes in contact with *B* the current will not leave *B* and find a way back by the earth (as it would do if two separate out and home conductors were used), but it is controlled by *A* and any leakages can only be to *A*. Hence, with a conductor, constructed, as above shown, with a current passing through it of 10,000 volts, any one may hold *B* in their hands and they will receive no shock, and no current will pass into them. This has been practically demonstrated by a test on the Underground Railway, where one of the writers of this article held, as many others did, *B* in their hands, while a current of great pressure was passing through it, a pressure that would have meant instant death if it had been possible for the current to leak from *B* and pass through the body to earth. Thus we have the double safety, the bridge and nature of the conductor used, this safety being not only, as the reader will observe, a safety against fire but it is an absolute safety to human life. And thus a man may work in close proximity to a conductor constructed as suggested, in fact, he may sit on it while he is working, and he will be out of all danger, and he is no longer, as Mr. Edison suggests, in fear of a "death-dealing current," for the current, whatever the pressure, whatever its quantity, is so controlled as to be absolutely harmless. Thus, to sum up the meaning of the above concentric mains, we may say that, whatever fault may occur, the whole effect is produced and contained in the main itself, and it is impossible that there can be and there is, in fact, no danger, and no damage done outside. We have thus a perfect protection for life and property from all forms of current.

Again, Mr. Edison says, there is "no known insulation which will confine these high-tension currents for more than a limited period"; and again he says, "the influence of the air or of gas or other agents renders it (the insulation) finally very susceptible of being pierced by a spark of static electricity." Mr. Edison would have been more accurate if he had said that there was no insulation known to him which would confine these high-tension currents for more than a limited period; and again, how can the air, gas, or other agent get at the insulation if it be confined between two tubes in the way suggested and they are properly joined the one tube to the next? Again, if the mains be constructed according to the figure and a spark of static electricity did pierce the insulation, what would be the effect? There would be no danger, no external damage; too great a quantity of current would flow over the bridge and the bridge would give way, and as before explained, no detrimental effects would be produced. But there is an insulating substance known which was manufactured before the commencement of the Christian era, of which specimens that have been exposed to the air for centuries still exist in perfect preservation. How will such an insulator stand when hermetically sealed between two tubes? Then again, Mr. Edison says, "the risk, too, is greatly increased by the fact that consumers who are supplied with current from a low-tension system are accustomed to handle their electrical appliances freely, knowing them to be harmless; I say nothing of the injustice to vendors of harmless supplies of electricity." Here again, Mr. Edison knows, and no one better, that even if the current is sent out from the central station at a tension of 10,000 volts the tension is lowered at distributing stations by a suitable device, and that current the consumer has to handle is only at a pressure of 100 volts, and the pressure is so lowered and controlled that by no possibility whatever can the higher pressure get into any house. What, therefore, is the difference in the danger to the consumer whether the current has an initial pressure of 100 volts or 10,000?

Mr. Edison speaks of the alternating current as being more dangerous to life, and no doubt it is, if a high pressure were used in the customers' houses; the writers were however, both present when Colonel Armstrong, as the representative of the Board of Trade,

[1] By S. Z. de Ferranti and Francis Ince, in *Engineering*. Continued from No. 746, page 28.

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called upon them, for the purpose of trying the effect of shocks from an alternating current at varying pressures, and in our presence he first of all took a shock from an alternating current machine at 50 volts, he then had the pressure increased to 100 volts, and then to 150 volts, and then to a pressure of 200 volts, at which pressure he said he was satisfied, and he could bear the 200-volt shock with perfect ease, being a pressure of twice that used in consumers' houses; in fact, in the Board-room of the London Electric Supply Corporation there are two openly exposed terminals, and the directors constantly take hold of these, the effect of the 100-volt alternating shock being hardly perceptible, and being rather pleasant than otherwise. Further, we have had several accidents where men in the station have received a shock direct from the machine with a 2,400-volt alternating current, but not in one instance has death resulted. Mr. Edison speaks of the danger to life of alternating currents at low pressure, but it should be borne in mind that the specimens experimented on at Mr. Edison's laboratory were pickled and prepared so as to make the effects of the current as deadly as possible, and were therefore placed in an unnatural condition.

This article shows that the saving of copper in the mains or conductors is enormous as the tension increases, and what this means may be made more clearly apparent by a statement of the fact that if the pressure from the station was 100 volts only, the stations to light London could not be placed at a greater distance than a mile apart, each station lighting a half-mile radius, as otherwise the copper mains would have to be of such an enormous size to carry the quantity of current that would be required at this low pressure, that the cost of mains alone would render the price at which the current could be supplied so high as to make lighting by electricity impossible.

Again, it is much more costly to build a large number of small stations than one large station, and every small station requires its staff, its engine-drivers, etc. In a large station one man can drive a 10,000 horse-power engine which will light 200,000 10 candle-power lights, whereas with small stations and small engines, say of 250 horse-power each, which would light 5,000 10 candle-power lamps, each engine must have its attendant; and the question is not, as Mr. Edison would suggest, a mere question as to saving a few pounds "in investment in real estate and copper;" it is a question of saving so much as to make the difference between success and failure, where it is necessary to compete with gas at a low price. But this is not all: in large cities it is impossible to buy land at every mile, and to put up a central station for the manufacture of electricity, for the station is a nuisance, and one is perpetually harrassed with litigation; application after application is made for injunctions; the taking of coal in the large quantities required is a nuisance; the smoke is a nuisance, and only high-priced steam coal can be used, and that, too saddled with the heavy expense of cart-carriage; the vibration and noise from the engines is a nuisance, and stations in the residential parts of any city will be stopped one after the other by injunction.

Again, at these small stations, spread over a city, to get water is a difficulty, and in consequence power can only be obtained at a very high rate of coal consumption; whereas, with a suitable site at a distance, the quantity of coal used can be reduced enormously, making a saving which will alone go far towards a dividend on the capital expended.

These are all circumstances that require most serious consideration, and Mr. Edison's argument on these points is in fact a mere argument in favor of a monopoly for his low-tension system, a system which can exist and be carried on profitably in America, where the price of gas is enormous; a system which would render electric lighting impossible in London with gas at 2*s.* 5*d.* per 1,000 cubic feet, and a system which makes the people of America pay a price for their lighting unnecessary to give a good return on capital invested on a better and a less costly system.

Mr. Edison points out that a larger number of fatal accidents have occurred through electricity in New York than in any other city in the world, and gives the reason that New York has a greater number of wires overhead than any other city in the world. No doubt this is the reason, coupled with the fact that probably in no other city in the world are the overhead wires arranged more negligently and with more disregard for the care of human life. There can be no doubt but that overhead wires, whatever the care may be that is taken with them, are, and always must be, a danger, but with conductors placed underground, and with due care, and properly constructed, there can be no danger whatever. Mr. Edison has pointed out that in this country the safety of the people is placed in the hands of the Board of Trade, a body we have found most obliging and most reasonable in their requirements, while insisting with the utmost severity that no system shall be adopted which does not give absolute safety to human life, and who, after seeing our work, have been perfectly satisfied to advise the Government to pass our Act, which enables us to deal with a 10,000-volt current.

Mr. Edison does not deal with the transmission of power from those scources which nature gives us for nothing at certain centres; we refer to water-power, and from which by aid of high-pressure electricity, and high-pressure electricity alone, can the force be transmitted to a distance and utilized for the purposes of man; according to Mr. Edison these forces are to run on unutilized forever as they have done for ages past. His argument that because a nitro-glycerine factory is dangerous on the surface of the earth we should not think of putting it underground, is not applicable to the subject of electricity or to the putting of electric mains underground, though we cannot say that the idea of the nitro-glycerine factory underground is so absurd as Mr. Edison appears to think; for it will be within the memory of many of our readers that about fifteen years ago a barge laden with gunpowder on the Regent's Canal exploded at the bottom of the Avenue-road, where the canal is in a deep cutting, and the opinion of one of our great experts was that this fact saved London, serious as the damage was in the immediate neighborhood. It is clear beyond a doubt that if mains are properly placed underground there can be danger to no one, and no accident can take place.

We think we have said enough to show that the dangers of electric lighting are no more in the high tension system than the low, provided both systems are carried out with equal care and all proper safety devices are used in the one case and in the other; without these devices and without this care neither system is safe, and it is clear beyond a doubt that the low-pressure system is not safe as at present carried out in New York and it never will be until the State steps in and the use of electricity is regulated there by well-devised rules and under the supervision of competent officers; but Mr. Edison is as far behind the time when he suggests that no station shall send out a current at a pressure exceeding 100 volts as the alarmists were when railways were first introduced, and it was considered that no train could, in safety, ever run at a rate exceeding twenty miles an hour.

No doubt if a train ran at only ten miles an hour an accident would not have such serious results as with a train running at fifty miles, but is this an argument why trains should not run at fifty miles per hour? We have to consider the percentage of risk, and this we find has not been materially increased by the increase of speed. So it is with electric pressure. As the pressure increases, extra precautions have to be taken with regard to safety, and we believe with Sir William Thomson, who stands as an authority in the world of science as high as Mr Edison, that it is not a question whether a pressure of 10,000 volts (the highest pressure yet utilized) is to be used or not. The pressure may be anything so long as proportionate precautions are used, and we think it may be that in a few years time people will think as little of 10,000 volts as we do now of 1,000, and will laugh now at the present alarmist idea that in a pressure of 100 volts the limit of safety has been reached.

Mr. Edison says in his article, "The public would scarcely be interested in the details leading up to the conclusions to which I have come, for the reason that it would involve a mass of matter such as they have been attempting to digest during several months past." We have not adopted Mr. Edison's dogmatic method of dealing with the subject, and do not know to what mass of matter he refers. We have avoided attempts to give results the weight of our opinions without giving reasons; we have explained as clearly as we are able our views, giving such reasons as would enable the general public to follow our arguments, without, we hope, too much trenching on the land of technical science, and we trust our readers will see that there are other arguments besides those of Mr. Edison, and that there are reasons why the dangers of electric lighting under a high-pressure system are no greater, if they are so great, as those of a low-pressure system, for which Mr. Edison clearly claims (while he disclaims) a monopoly.

Mr. Edison very properly gives great weight to facts. Let him then consider that in New York the deaths through electric shocks have been very frequent, with a tension, we believe, never exceeding 2,000 volts, and rarely exceeding 1,000; while in London, where for years we have been using a tension of 2,400 volts with miles of both overhead and underground conductors, we have never had a single accident with our mains or a single death. Why this difference between London and New York? The reply is that here our work is done properly, there it is not. Our work is put up to last, theirs in New York to serve the purpose of the moment.

If the reader has followed us so far and will allow us in closing this article to be prophetic, we will say that in the future our railways will be worked, our lighting will be done, our power will be transmitted to a great distance; all this will be done entirely by the aid of high-pressure electricity; it is high pressure in electricity like high pressure in steam, which is going to carry — which is carrying — everything before it, and this high pressure will be used, and will be doing the work of the world, when the low-pressure system Mr. Edison now so strongly advocates, has passed away and been forgotten.

A New Source of Portland Cement. — A new source of supply of Portland cement has been opened up by the recent discovery of the immense deposit of carbonate of lime and cement clay underlying the former in the county of Grey, Ontario. The deposit is, according to the *Builder*, only two miles from the Grand Trunk Railway of Canada, and only nine miles from Owen Sound of the Georgian Bay. The carbonate of lime is stated to be purer than the European chalk, and the clay much the same as the well-known Medway clay, and contains 62 per cent of soluble silica. Canada imports about 100,000 barrels of Portland cement annually, and the United States procure from Europe over 1,000,000 barrels. Not a barrel of Portland cement of commerce has, so far, been made in America, although an inferior kind of cement or water-lime is manufactured. The reason is obvious, no carbonate of lime having heretofore been found on the American continent pure enough to make superior Portland cement. It is believed that a cement superior to any imported can be produced as cheaply as European manufacturers are able to place the raw material on the ground. — *Invention.*

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COLORADO'S MINERAL PALACE.

"All the Modern Improvements." — No. 6.

"WHAT Colorado should have an exhibition building worthy of its size and resources has long been the desire of its leading citizens. Many plans have been discussed and locations suggested. In point of fact, the question of location has had a good deal to do with the project not being carried out some time ago. At length, however, the question has been settled. Denver has gracefully acceded, and the building is fast approaching completion in Pueblo. Looking at it all round, there is no cause for wonder at the selection of this city. Pueblo is situated upon the Arkansas River, where the rich valley mingles with the plains. To Pueblo comes immense quantities of ore to be smelted, and the Bessemer steel-works there, the largest of their kind in the United States, promise to extend their operation until a second Pittsburgh seems certain to have existence at no distant date. At present it is a city of between 40,000 and 50,000 inhabitants, and is growing rapidly.

The site for the building having been determined upon, the question of design only remained for the promoters to decide. It was important that the building should be suggestive of Colorado products, and it must be admitted that for uniqueness of conception and appropriateness of architecture the Mineral Palace will stand as a model. The style of architecture is early Egyptian, and Mr. Bulow, the architect, has produced a massive structure, which has at the same time lightness and symmetry. It is rather difficult to convey to any one a just idea of the beauty of the building, especially of the interior. Outside it is surrounded by massive stone columns 5 x 7 at the base and tapering to 3 x 5 at the top. The columns will be all constructed of native stone. Gray granite from Georgetown, Silver Plume and Gunnison, red granite from Platte Cañon and sandstone from Manitou, Fort Collins, St. Vrain, and Castle Rock, together with marble from Crystal, will be used in these columns. These, however, are only a few of the many quarries which will contribute their quota. Every quarry in the State will be represented, regardless of location and distance. The walls of the building proper are back of the columns which, however, form the principal support of the roof. A corridor twenty-one feet wide between the pillars and the walls runs entirely around the building. Those walls will be constructed of wood and covered with designs in crusted ores and minerals — native gold, platinum, silver, mercury, copper, etc., and the various ores of the same. Specular and magnetic iron, chromic iron, pyrites, galena, quartz, mica, beryl, tourmaline, garnet, asbestos, brucite, fluorspar, coal in all its varieties, etc., etc., will be used as pigments. "Pilasters of white or colored marble, alabaster, onyx, agatized wood, obsidian, and everything of a mineral nature that can be used with artistic effect, including fossils and other petrifactions, will find a place both inside and outside of the edifice."

There will be no windows in the building, so that electricity will light the interior both day and night, and the lamps will be arranged so as to add splendor to the glittering walls. Removed from the walls a distance of fourteen feet are pillars fourteen feet apart, supporting an interior dome beneath the roof. These pillars and the corresponding pilasters against the walls are closed to a height of ten feet with plate-glass, behind which will be displayed the rich and valuable specimens to which it would be dangerous to permit free access. The central dome is one hundred feet in diameter, and will be a marvel of brilliancy when the thousands of polished facets of copper, steel and crystal flash with prismatic colors under the brilliant electric lights, hidden from view under the frieze at its base. A fountain playing under the dome will add beauty to the scene. At one end of the building will be a platform which will be used for public addresses, concerts, etc.

The contracts which have been been made for the erection of this remarkable building amount to over $250,000, and Secretary Nelson informed your correspondent that when the mineral exhibit was placed in position and the interior decorations were finished, the whole value would approximate $1,000,000. Viewing the project from a business point-of-view, one cannot but be struck with the energy and enterprise of people who are ready to invest such a large sum in a building which is almost purely for the benefit of the State generally. It is not a money-making scheme; it is simply a bold, original plan to show the world what Colorado is and what it is capable of doing.

A well-known Western writer has said regarding it: "The Mineral Palace will be one of the most remarkable buildings ever erected, and it is doubtful if at any previous time it was possible to construct such a building. Nothing but the unequalled resources of Colorado could supply the materials. . . . One may have a hazy idea of what Colorado has stored in her mighty mountains; but this will be an object-lesson that will impress the mind as no amount of reading or description of the boundless resources of the Centennial State would do. To enumerate the materials of which this unique building will be composed would be to make a list of the minerals of Colorado, which would also be a list of the minerals of the world. No words can adequately describe the cunning workmanship and artistic beauty that is being wrought in this Mineral Palace. It is a thing that must be seen to be understood, studied to be appreciated." — *W. L. A., in the New York Evening Post.*

SAFE BUILDING.[1] — XI.

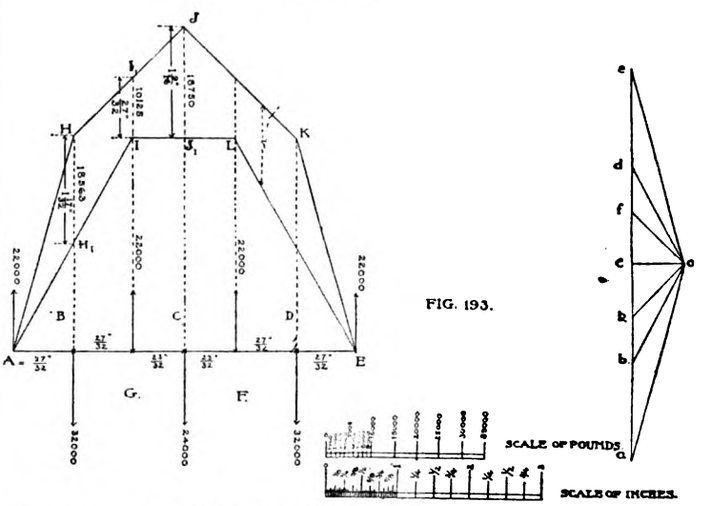

FIG. 193.

Graphical method more simple. THE graphical method of obtaining bending-moments is frequently much more simple than the arithmetical method; in important calculations both should be used so as to check each other.

All the rules for formulæ given in Chapter VII for the calculation of transverse strains by the graphical method will apply equally well for pins; the only difference will be that where there are more than two forces on each side of the pin, the base line of the polygonal figure between reactions p and q will no longer be straight, but will be composed of several lines.

Thus, if we take the pin and forces shown in Figure 189, we should change the notation to that adopted for the graphical method, which would be as shown in Figure 193. That is force E (22000 pounds) of Figure 189 would be known as $A\ B$ in Figure 193; again force C_1 (32000 pounds) of Figure 189 would be called force $E\ F$ (*not* $F\ E$) in Figure 193.

Example solved graphically. Proceeding now to the calculation, we lay off along the vertical load line $a\ e$, the following forces:

$a\ b = A\ B = 22000$ pounds.
$b\ c = B\ C = 22000$ pounds.
$c\ d = C\ D = 22000$ pounds.
$d\ e = D\ E = 22000$ pounds.

and in the opposite direction, we lay off:

$e\ f = E\ F = 32000$ pounds.
$f\ g = F\ G = 24000$ pounds.
$g\ a = G\ A = 32000$ pounds.

which will, of course, bring us back to the starting point a, as the opposing forces must aggregate the same sum.

We now select our pole o. This we remember can be arbitrarily located, or else at a distance $o\ c = \left(\frac{k}{f}\right)$; in our case we will make the distance, say, 12000 pounds.

Pole distance. The distance (of pole from load line) being arbitrary we shall multiply the verticals v (inch-scale) in Figure 193, by this pole distance (pounds-scale) to obtain the bending-moments at the points of pin immediately below verticals. If the pole distance from load line had been made $= \left(\frac{k}{f}\right)$, then the length of verticals v measured at inch-scale would have been the *required* moments of resistance of the corresponding points of pin below verticals; and each respective v multiplied by $\left(\frac{k}{f}\right)$ would be the bending-moment at each point. We will, however, make in our case the pole distance, arbitrary, *viz:* $c\ o = 12000$ pounds. We now begin at any point of line $A\ B$ and $A\ I$ paralell $b\ o$ till it intersects $B\ C$ at I; next draw $I\ L$ parallel $c\ o$ to intersection with $C\ D$ at L; and similarly draw $L\ E$ parallel $d\ o$; $E\ K$ parallel $o\ e$; $K\ J$ parallel $o\ f$; $J\ H$ parallel $o\ g$ and $H\ A$ parallel $o\ a$; the last line must intersect the first at point of starting A or some error has been made.

Strain diagram.

It will be noticed that the individual outlines of $A\ I\ L\ E\ K\ J\ H\ A$

[1] Continued from page 201, No. 744.

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cover the capital letters in Figure 193, corresponding to small letters from which their respective parallel lines started in strain diagram. Thus, for instance $A\,I$ covers letter B and is parallel to $b\,o$; similarly $I\,L$ covers C and is parallel to $c\,o$; $L\,E$ covers D and is parallel $d\,o$; $K\,J$ covers F and is parallel $o\,f$; $J\,H$ covers G and is parallel $o\,g$; similarly we can consider $E\,K$ as covering E and it is parallel $o\,e$; and $H\,A$ as covering A and it is parallel $o\,a$.

Curve of bending-moments.

We now measure the verticals through the figure $A\,I\,L\,E\,K\,J\,H\,A$, the longest, of course, will give the greatest bending-moment. This happens to be the central one $J\,J_1$ it measures $1\frac{9}{16}''$, therefore

$$m_J = 1\tfrac{9}{16}.12000 = 18750$$

which corresponds to m_B of Figure 189.

Similarly we should have:

m_I (formerly m_{E_1}) $= \frac{21}{32}.12000 = 10125$ pounds-inch.

m_H (formerly m_C) $= 1\frac{17}{32}.12000 = 18563$ pounds-inch.

Had we analyzed the strains on pin as shown in Figure 192 graphically, our verticals would have measured,

at E:

$$v_E = \tfrac{3}{16}''$$

at C:

$$v_C = 1\tfrac{13}{16}''$$

at E_1:

$$v_{E_1} = \tfrac{31}{32}''$$

and at B:

$$v_B = 1\tfrac{3}{8}''$$

The corresponding bending-moments would have been:

at E:

$$m_E = \tfrac{3}{16}.12000 = 2250 \text{ pounds-inch.}$$

at C:

$$m_C = 1\tfrac{13}{16}.12000 = 21750 \text{ pounds-inch.}$$

at E_1:

$$m_{E_1} = \tfrac{31}{32}.12000 = 11625 \text{ pounds-inch.}$$

at B:

$$m_B = 1\tfrac{3}{8}.12000 = 16500 \text{ pounds-inch.}$$

which are very close to the correct moments, which we found arithmetically to be:

$m_E = 2250$ pounds-inch; $m_C = 21637$ pounds-inch;

$m_{E_1} = 11617$ pounds-inch; and $m_B = 16648$ pounds-inch.

Simplest method use curve of moments of resistance.

The simplest method of calculating pins, as a rule, will be — after calculating (or ascertaining from Tables) the safe bearing and shearing stresses of the pin, — to calculate the actual moment of resistance of the pin, see Table I, Section No. 7, fourth column. Now proceed graphically, being sure to make the pole distance in every case equal to the safe modulus of rupture $\left(\frac{k}{f}\right)$ of the material of pin.

After this it will only be necessary to see that none of the verticals through the different polygonal figures (corresponding to $A\,I\,L\,E\,K\,J\,H\,A$ of Figure 193) — that none of these verticals measure at inch-scale *more* then the actual moment of resistance of the pin. If this is done the calculation and selection of the best arrangement becomes very simple and easy. After the final and best arrangement has been determined on, it would be well to calculate arithmetically the moments as per this final arrangement, thus checking the graphical solution.

Contractors claim of no bending-moment ridiculous.

The writer has frequently been told by contractors that owing to the friction due to the pressure of the nut and head, that it was impossible for any bending-moment to take place on a pin. As well it might be claimed that owing to the pressure of the walls, there is no bending-moment on a built-in beam. The safe modulus of rupture of a built-in beam can be assumed higher same as we do for pins, but the beam will break across if too heavily strained and so will the pin. Besides it must be remembered that the heads of eye-bars necessarily cannot fit the pins perfectly; and even if the argument were correct, (which it is not,) that friction offsets the bending-moment, the least rusting of the joints would diminish the pressure between nut and head, thus destroying its value.

Again, contractors will admit that there exist bending-moments on pins, but will deny it in the case of rivets, though the cases are precisely analogous; this latter argument though, if sifted, will generally lead the contractor to admit that its real basis is the large number of rivets it frequently requires; and the less rivets he can get along with, the happier will your contractor be.

Louis DeCoppet Berg.

[To be continued.]

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF EDWARD STANWOOD, ESQ., HIGH STREET, BROOKLINE, MASS. MR. CLARENCE S. LUCE, ARCHITECT, NEW YORK, N. Y.

[Helio-chrome issued only with the International and Imperial Editions.]

The plans and some of the details of this house were published in the *American Architect* for February 28, 1880.

"BOULDER-POINT," A HOUSE AT TUXEDO, N. Y. MR. BRUCE PRICE, ARCHITECT, NEW YORK, N. Y.

A reference to this house will be found on page 46 of our last issue.

CHURCH AT OAKLAND, CAL. MESSRS. WALKER & BEST, ARCHITECTS, BOSTON, MASS.

HOUSE ON R ST., WASHINGTON, D. C. MR. W. CLAUDE FREDERIC, ARCHITECT, WASHINGTON, D. C.

NEW CLUB-HOUSE OF THE JUNIOR GERMANTOWN CLUB, GERMANTOWN, PHILADELPHIA, PA. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

PHILADELPHIA BITS. DRAWN BY MR. FRANK E. MEAD.

BUILDING FOR THE "PETER B. BRIGHAM ESTATE," CORNER OF CAUSEWAY AND PORTLAND STS., BOSTON, MASS. MESSRS. HARTWELL & RICHARDSON, ARCHITECTS, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

STUDY OF M. F. SPITZER, PARIS, FRANCE.

[Copper-plate Etching.]

This plate represents a room in the house of one of the richest, as well as the most amiable collectors of bric-à-brac in the world, M. Frederic Spitzer, whose possessions in the way of beautiful objects of mediæval and early Renaissance domestic art surpass in value those of most of the great European Museums. The room shown is the "Cabinet de travail," the first of a series of apartments, which contain, in all, more than four thousand precious works. The chimney-piece facing the spectator comes from the Château of Arnay-le-Duc, and is illustrated in Sauvageot's book, the "*Palais, Châteaux, Hôtels et Maisons de France du XV^e^ au XVIII^e^ Siècle.*" The two carved oak doors, of which only one is shown, are Spanish, and date from 1541. The painted panels in the frieze are from the ceiling of the grand hall in a palace at Cremona. The large picture near the door is Flemish tapestry. The plaques on the walls are of Hispano-Moresque faience: the furniture is from Burgundy and the Lyonnais, and from Spain: and the bronzes, majolica and marble statuettes are by Peter Visscher, Riccio, and other scarcely less distinguished artists. Very recently, M. Spitzer has published a catalogue of his treasures, illustrated with three hundred and fifty plates, half of which are colored, and eight or nine hundred smaller cuts, all executed by the aid of photography, which seems likely to become the most important work on the minor arts which has ever been issued.

PROJECT FOR ADDITION TO THE CITY-HALL, FÜNFKIRCHEN, HUNGARY. HERR RUDOLF KLOTZ, ARCHITECT, VIENNA, AUSTRIA.

[Gelatine Print.]

This design was placed first in competition, about two years ago, but the execution of the work was confided to a Hungarian architect.

SECTION THROUGH NEW PORTION OF SAME.

PLANS OF SAME.

[Gelatine Prints.]

ADDITIONS TO SHANDON, TUNBRIDGE WELLS, ENG. MR. M. E. MACARTNEY, B. A., ARCHITECT.

STABLES: SHANDON, TUNBRIDGE WELLS, ENG. MR. M. E. MACARTNEY, B. A., ARCHITECT.

PENCIL SKETCHES: THAXTED; ECKYNGHAM CHURCH, SUSSEX; CHURCHYARD CROSS, ST. JOHN'S, NITON, ISLE OF WIGHT; ST. JOHN BAPTIST, BREDGAR, KENT; THE TOMB OF EDMUND LANGLEY. BY MR. H. P. BURKE DOWNING, ARCHITECT.

A few short notes descriptive of the subjects of these sketches may prove interesting.

Thaxted, in Essex, is a town of considerable antiquity, and formerly of some importance, though now diminished and diminishing. It contains, besides the church, which is here sketched, many buildings of interest. The church itself, sometimes designated the "Cathedral of Essex," is notable for its size, as well as its beauty and antiquity, being some 183 feet long and 87 feet wide inside, and

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its tower and spire are 180 feet high, and visible for many miles. The building is supposed to have been commenced in the reign of Henry III, and subsequently added to by many hands at several times, which makes the uniformity and excellent proportions exhibited all the more remarkable. The list of contributors to the beautiful edifice includes the families of Clare, Mortimer and Edward IV. William de Burgh gave the nave: the porch was added by Lionel of Clarence, and the transepts by the last Earl of March. For architectural students its buttresses, canopies, pinnacles, tracery, sculpture, tower and spire are worth careful study.

Eckyngham Church, Sussex, is a most beautiful example of fourteenth-century work, having been rebuilt in its present form, in honor of God and the Blessed Virgin Mary and St. Nicholas, as we learn from a brass in the chancel floor, by William of Eckyngham, who died in 1389. The thirteenth-century trefoil-headed doorway in the south side of the chancel and the font — both clearly of an earlier date than the rest of the building — plainly indicate the existence of a previous church, which seems confirmed by the Latin inscription on the same brass mentioned above. The present church has nave, north and south aisles (the east end of each dedicated as a chantry), and a very long chancel. There is a central tower, but no transepts. The window tracery is throughout very striking and beautiful, and the windows were all formerly filled with painted-glass, though but few and unimportant fragments have survived.

Churchyard Cross, St. John's, Niton, Isle of Wight. — The singularly beautiful churchyard cross, of which a sketch is given, stands in front of the south entrance of the church of Niton, a pleasant, sheltered village at the head of the valley leading down to the sea at Reeth Bay. The church, as well as the cross, is ancient, being one of the six founded by William Fitz Osborne.

St. John Baptist, Bredgar, Kent. — The church at Bredgar, close by Sittingbourne, consists of nave, chancel, north and south aisles, western tower and south porch. The character is partly Perpendicular, partly Decorated; but a Norman doorway, as is often the case, has been reinserted in the west side of the tower, and is, in fact, the only trace of ancient work. The walling is of flints, which is abundant in this chalk district, with stone quoins, and, as might be expected from the nature of this material, remains in excellent preservation. The embattled tower is divided into three stages. It has square-headed belfry windows of two lights, and on the west face a single-labelled, trefoiled light below. At the southeast angle is the Kentish octagonal turret, with steps leading to the belfry.

The Tomb of Edmund Langley in All Saints' Church, King's Langley, by St. Albans, is supposed to have been removed here in about 1575 from the Priory Church, which had existed up to that date. It is now placed in the Langley Chapel at the east end of the north chancel aisle, to which it has been quite recently removed from the north side of the sacrarium, which had been its first resting-place in this church. The tomb has coats-of-arms on three of its faces, on each of the north and south ends being three shields, and on the side face seven.

THE ENTOMBMENT.

From a cartoon by G. Guffens.

SOCIETIES

NEW YORK CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

A REGULAR Monthly Meeting was held at the Chapter office in the Welles Building, 18 Broadway, on Wednesday, April 9, 1890, at 3 P. M.

President Littell in the chair.

The minutes of the last two meetings were presented and approved.

The following reports were read and laid on the table for future reference:

From the Executive Committee, being an excerpt from the minutes of a meeting held by it on the 4th instant, as follows:

President Littell said he had not considered it necessary to make a special call for a full meeting of the Chapter, but that this special meeting of the Executive Committee had been called by himself and the Secretary to confer as to the best procedure for carrying out the spirit of the instructions given at the last meeting of the Chapter to a Special Committee charged with the duty of communicating with the proper State officials at Albany in relation to a proposition embodied in Assembly Bill, No. 853, entitled, "An Act fixing the salary of the Commissioner of the Capitol." In view of current statements of the newspapers on the subject, it was a question with him whether the Chapter at that meeting had full possession of the facts of the case. The question was whether, by the proposed Bill, the functions of the Commissioner of the Capitol would be confined to existing Government buildings or whether they would extend to those to be designed in the future. The Special Committee, consisting of himself and Messrs. Kendall and Wright, had already prepared the draught of their communication to the authorities. The said draught was then read, and Mr. Littell proceeded to say that if the proposed Bill was to be understood, as it evidently was by some of the newspapers, as referring only to existing buildings, the protest embodied in the draught would seem to be unnecessary.

The Secretary read some newspaper slips on the subject.

Discussion followed and Assembly Bill, No. 853, was read.

The Secretary said the wording of the Bill was ambiguous, and might be interpreted in both of the ways mentioned.

Moved by Mr. Wright that after amendments in the discretion of the Special Committee the protest be forwarded first to Mr. Sloan, Chairman of the Senate Committee on Finance, and then to the other parties named by the Chapter. Carried.

From a Special Committee as follows:

April 9, 1890.

To the New York Chapter, American Institute of Architects.

Your Special Committee to prepare a communication to the authorities at Albany in relation to Assembly Bill, No. 853, respectfully report that they prepared the following draught which, after amendments suggested at a conference of the Committee with the Executive Committee on April 4, 1890, was forwarded first to the Chairman of the Senate Finance Committee, and the Lieutenant-Governor, and afterwards to the other members of the Senate; while a further supply, including printed copies, awaits further legislative action for distribution at the proper times.

The New York Chapter of the American Institute of Architects beg to protest against the proposed legislation now before the Ways and Means Committee of the Assembly of the State of New York, entitled "An Act fixing the salary of the Commissioner of the Capitol," for the following reasons:

1. The result of this Bill would be to throw the design and construction of all State buildings into the hands of one man, selected, as a rule, for reasons other than the highest æsthetic and constructional ability.

2. The people of this State have a right to be properly represented in their buildings, which are the monuments by which they themselves are judged, and they cannot be so represented by any single person, whether selected mainly for political or any other reasons.

3. The Bill deprives the people of the State of the services of the best members of the architectural profession, and provides an insufficient substitute.

4. The Bill deprives the architects of the State of the natural rewards of eminence in their profession.

5. The Bill would repeat in this State the evils surrounding the constitution of the office of the Supervising Architect of the Treasury in Washington, as admitted in official report for 1874, pp. 14 and 15.

6. The Bill would create a centre for the distribution of patronage with all its attendant evils, to some of which the attention of the people has lately been directed.

7. The scheme of an official architect is more expensive to the taxpayers than if the State engaged the services of the best architects at the usual rates of compensation.

We respectfully submit that the appointment of an architectural commission or advisory board, consisting of three architects and two officials of the State, would better serve to secure the best architectural results; the commission to exercise in general all the functions of a building committee where work is being done for a private corporation, and to be remunerated for their services.

Respectfully submitted,

Emlen T. Littell,
Edw. H. Kendall,
F. A. Wright.

The Secretary stated that inquiries had been made as to what action had been taken in regard to the letters of Messrs. Holly and Goodhue, referred, at a former meeting, to the Special Committee on Increase of Membership. The Secretary was instructed to communicate with the Chairman of that Committee on the subject.

The following communications were read and received with thanks:

A letter from Mr. James G. Cutler, President Western New York State Association of Architects, March 29, 1890, thanking the Secretary for enclosures and desiring closer union between the New York Chapter and his Association, which would undoubtedly soon be reorganized as another Chapter of the Institute.

A letter from Mr. Root, Secretary American Institute of Architects, March 18, 1890, enclosing copy of blank form of application for membership in the Institute, and asking the assistance of the Chapter in distributing such. The Secretary said he had already issued to reputable architects, non-members of the Institute, some of the few copies of said application form received from Mr. Root.

A circular letter from the Boston Architectural Club, stating its intention to hold an exhibition of architectural work in Horticultural Hall, for the three weeks beginning May 12, 1890, and requesting contributions from all interested in art and architecture. A blank form for contributors to fill up accompanied the circular.

The following resolution, moved by the Secretary, was adopted:

"*Resolved*, That the New York Chapter, American Institute of Architects, receives with pleasure the notice of the Boston Architectural Club for an exhibition of architectural works to begin May 12, 1890, under its auspices. The Chapter is in sympathy with such movements everywhere, not only because successful results from them tend toward the promotion of art on its architectural plane, but because they materially assist to obliterate the provincial spirit which sometimes stands in the way of fraternal intercommunication and union, and the public support that is gained thereby."

A letter from Mr. Root, Secretary American Institute of Architects, of March 18, 1890, calling the favorable attention of the profession to an enclosed circular from the Council of the Archæological Institute of America, asking contributions toward a fund to secure

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the expropriation of the village of Kastri, now covering the site of the Delphi of ancient Greece. Laid on the table for future reference.

A letter from Mr. A. J. Davis, Corresponding Member of the Institute, of April 4, 1890, thanking the Secretary of the Chapter for "sundry pamphlets" and making a donation to the library of two quarto volumes, John Howard the philanthropist, being the author of both, one on "*The State of the Prisons in England and Wales*," 1777, and the other "*An Account of the Principal Lazarettos in Europe*," 1789. A vote of thanks was unanimously passed to Mr. Davis for his rare and interesting contribution.

The statement being made that in the recently issued proceedings of the last or Consolidating Convention of the Institute there is an omission of the annual report of the New York Chapter, as of the other Chapters, as well as of reports of some of the special committees and of minor matter, the Secretary said he understood there was to be a supplementary issue of the missing list of Honorary and Corresponding Members of the Institute; and perhaps it was the intention to issue all the missing matter in such supplementary form.

The Secretary was instructed to write to the editor of the proceedings for information on the subject.

Mr. Le Brun, Chairman of the Committee on Examinations, mentioned that Mr. Upjohn, of the same committee, had gone to Albany yesterday, to be in readiness to give any information that might be required of him in regard to the amended Building Law just submitted to the Legislature.

A. J. Bloor, *Secretary.*

ENGINEERS' CLUB OF PHILADELPHIA,

At the regular meeting, April 5, 1890, the Secretary reported the special meetings of the Board of Directors and Past Officers to take action with regard to the death of Mr. Frederic Graff. The following announcement had been prepared by the Committee whose names are appended thereto:

To the Engineers' Club of Philadelphia:

With much sorrow we announce officially the decease of our late fellow-member, Frederic Graff. Mr. Graff was President of the Club during the the third year of its existence, and has been active as a director of its business affairs, and, as a member, participated in the discussions and proceedings of its meetings, for which his extensive knowledge, not only of professional matters, but of those having general interest, eminently fitted him.

The most responsible office filled by him in his native city, that of Chief Engineer of the Water Department, to which he was elected upon the death of his father, was marked by honesty of purpose, executive ability and a through acquaintance with the requirements of the position; and the successful discharges of its onerous duties added to his renown as an Engineer. As a man, his genial nature endeared him to his associates, and his loss to them will be a cause for deep regret.

Respectfully submitted,
Washington Jones, *Chairman,*
Henry G. Morris,
Thos. M. Cleemann,
Rudolph Hering.

On motion of Mr. Henry G. Morris, one of Mr. Graff's nearest friends, the foregoing report was adopted and ordered to be printed in the Record of Meeting and a copy thereof transmitted to the family of Mr. Graff.

The Secretary presented, for Mr. Frank Cooper, "Notes on Railroad Engineering Drawing." The author treats of kinds of drawings required, paper, tracing cloth, inks, tinting, lettering, plotting topography, scales, railroad curve patterns and filing drawings.

Mr. Edward Hurst Brown stated that it was the practice in his office, instead of making drawings on paper and then tracing them upon linen, to use smooth surface Crane's Bond Paper, which comes in sheets of various sizes. The drawings are made in pencil on this, and when correct are inked in at once, avoiding any chance of errors arising from the tracing linen slipping after a tracing has been begun. Blue prints are made directly from the finished drawings, requiring, with a moderately sensitive paper, from seven to eight minutes to make a print in bright sunlight. This method of making drawings not only saves the time usuallly required in making the tracing, but is a considerable saving of expense, as linen is by no means an inconsiderable item in office expenses.

Mr. Edwin S. Crawley described a new form of steam valve, in which packing is used instead of a ground seat. He exhibited a model and drawings.

Howard Murphy, *Secretary and Treasurer.*

ROCHESTER ARCHITECTURAL SKETCH CLUB.

The annual competition of the Rochester Architectural Sketch Club, an architect's office on an isolated lot, was decided, January 13, with the following results:

First Prize: Imperial Edition *American Architect*, E. S. Gordon. Second Prize: Regular Edition *American Architect*, Claude F. Bragdon.

The above competition, which the constitution of the club provides for, was the first of the club's annual competitions and was very satisfactory in its results.

The judges were three well-known architects, J. G. Cutler, O. K. Foote, Thomas Nolan.

THE SKETCH CLUB OF NEW YORK.

At a meeting of the Sketch Club of New York, held at No. 80 Clinton Place, New York City, on Saturday evening, April 5, the following Executive Committee was elected for the ensuing year: J. Addison Johnson, A. L. C. Marsh, Bertram G. Goodhue, Joseph J. Hall, Charles H. Israels.

This committee subsequently organized by electing J. Addison Johnson, *President;* Charles H. Israels, *Secretary;* and A. L. C. Marsh, *Treasurer.*

The club has just celebrated its first yearly anniversary, and its success during its short existence has been very encouraging and forty-three names are now upon its roll of members.

The Secretary may be addressed at 99 Nassau Street, Bennett Building, New York City.

COMMUNICATIONS

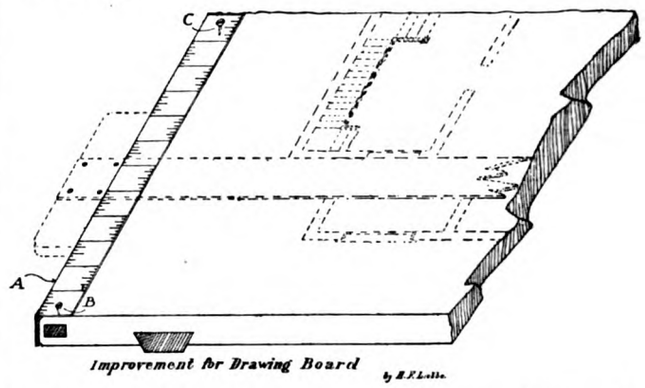
[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

AN IMPROVEMENT FOR DRAWING-BOARDS.

Des Moines, Iowa, March 15, 1890.

To the Editors of the American Architect:—

Dear Sirs, — Being an old subscriber to the *American Architect*, I thought possibly you would take an interest in a little invention which twenty years' experience in draughting has taught me the need



Improvement for Drawing Board

of. You will doubtless comprehend it all by a mere glance at the enclosed tracing.

Where *A* shows a metallic angle-iron provided with spurs at *B* and *C* so that said angle can easily be set at the end of any drawing-board or table, and thus provide for a perfectly true edge for the guidance of the head of the T-square. The outer edge being mathematically true, obviates the constant necessity of straightening up the edge of the boards, which never stay straight.

The top flange of the angle is quite thin, $\frac{1}{32}''$, while the reverse flange may be any desired thickness. A scale cut on the surface, and the manner of its arrangement will often obviate the use of ordinary scale.

A few angles of say 30″, 36″ and 42″ long would only be needed in the general drawing-room. Being portable, as soon as a board is filled, the angle can be placed on the edge of a new one, also can be replaced on the old, by setting spurs in the old holes.

The cost is but nominal, and the satisfaction of having a true run to the T-square, without any deviation, makes it an invention that will doubtless find favor with all who use the T.

Yours truly, H. F. Liebbe.

BOOKS ON WATER-COLOR AND PEN-AND-INK DRAWING.

Atlanta, Ga., April 17, 1890.

To the Editors of the American Architect: —

Dear Sirs, — Please be so kind as to recommend to me a good everyday book on Water-color Drawings and Sketches for Beginners, also one on Pen-and-ink Drawings, and oblige.

Yours respectfully, H. H. Walker.

[Get Ruskin's "*Elements of Drawing*," and go faithfully through all the exercises. Next to this, take up Aaron Penley's "*System of Water-color Painting*," or any of the little Winsor & Newton handbooks, on water-color painting and sketching. For pen-and-ink, Maurice B. Adams' pamphlets on architectural drawing, or Pennell's new book, are useful, but after training the eyes and hand by Ruskin's exercises, there is no better

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way of learning conventional tricks than to take one of Pennell's, Gregg's, Deane's, Norman Shaw's or Raffles Davison's drawings, and trace it, line for line. — EDS. AMERICAN ARCHITECT].

BEAMS.

BOSTON, MASS., March 26, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Figure 142, page 216, *Safe Building*, and Figure 64, page 89, *Building Superintendence*, disagree as to which is the upper side of a notched built beam. Which is right?

FIG 1.

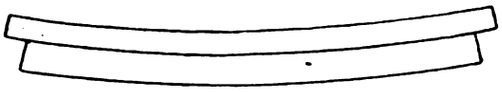


FIG. 2.

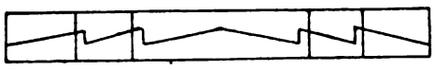
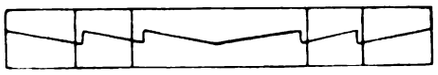


FIG. 3.



Respectfully, W. L. P.

[Rankine, who is good authority, prefers the form given in *Building Superintendence*, on the ground that two superposed beams, under a load, tend to bend independently thus, Figure 1, and notching like Figure 2, prevents this sliding both by the bolts and the abutting surfaces of the indents, while with notching like Figure 3, the indents are drawn away from each other by the separate bending, and the bolts alone resist the tendency. If the tendency is not resisted at all, the strength of the compound beam is simply that of two beams, each of the net depth of one component part. If it is perfectly resisted, the compound beam is four times as strong as the weakest component. The actual strength, in practice, varies between these limits, according to the completeness of the resistance obtained. — EDS. AMERICAN ARCHITECT.]

WATER-TIGHT FLOORING.

NEWBURYPORT, MASS., April 18, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you kindly give me the benefit of your experience on a question of flooring. In a factory about to be built it is very desirable to have smooth and tight top floors of wood. It is proposed to have under floors of 3″ spruce 8″ wide (market state), covered with $\frac{7}{8}$″ birch 3″ wide (dry).

Would such a floor be likely to remain tight? If it did remain tight would a thorough wetting from automatic sprinklers be likely to swell it to the extent of bulging the walls, and if so what would be the best method of guarding against this possibility.

Very respectfully yours, GEORGE P. TILTON.

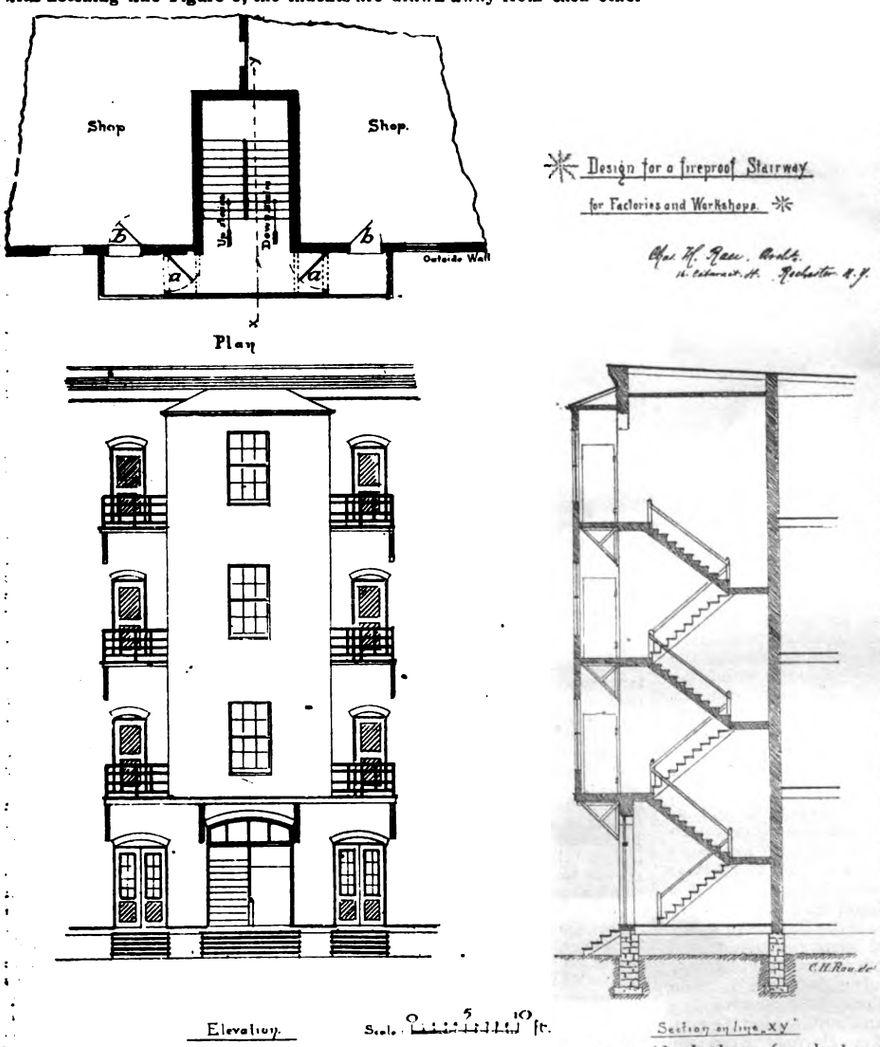
[The idea of making permanently tight floors in this climate with wood alone should be dismissed at once. It cannot be done. A smooth, neat floor, but not a tight one, can be made with three-inch under floor of spruce plank eight inches wide, covered with three-inch strips of seven-eighths inch maple or hard pine, *laid at right angles with the under floor*. If both floors run the same way, the under floor must be of narrow stock, three or four inch: otherwise each wide plank will draw up the narrow boards over it, so as to show joints over the joints of the under floor. If the upper floor were laid so dry, and so close, as to be approximately water-tight, the first warm, moist summer would swell it so as either to affect the walls, or force up the boards in ridges, according to circumstances. Wetting with sprinklers would have the same effect; and in either case the steam-heat of the next winter would cause the boards to shrink again to nearly their former dimensions, leaving open joints between them, and, of course, entirely destroying the water-tight quality of the floor. To get a floor which shall be perfectly water-tight, it will be necessary either to cover it with asphalt, which is good, but expensive, or to caulk it like a ship's deck, and have it looked after, and recaulked frequently; but a much less expensive floor can be made, which will be tolerably tight, by laying two plies of tarred felt over the under floor, mopping with tar, and laying the upper floor boards, matched in the hot tar. The nails will, of course, go through the felt, but if the work is done quickly, the hot tar will close around them. In any of these cases, it is important to pitch the floor to a gutter, with a drain-pipe and strainer, so that water will flow off at once. The floor may be laid only to within half an inch or so of the walls, to prevent any chance of bulging by swelling, and zinc flashing put around, just as in the case of a roof. — EDS. AMERICAN ARCHITECT.]

A FIREPROOF STAIRWAY.

ROCHESTER, N. Y.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — A dreadful disaster in our city (where nearly forty workmen lost their lives by fire) suggested to me an idea for a safe stairway for factory buildings, which can be built at a reasonable cost. I send you herewith the drawings and explanation as the result of my efforts. This stairway is isolated from the shop on three sides by 12″ brickwalls. To secure the greatest safety, these walls *should not be pierced by any opening whatever* and should reach from the foundation to the top of the building. The stairs themselves are constructed of wood and plastered on the under side. At each story a platform about four feet wide is built out on four iron brackets, and is plastered on wire-lath on the underside and tiled or cemented on the upper surface. The fourth side of stairway (facing street or open space) to be closed by partitions, which can be made of angle-iron with wire-lath stretched over, or of wood lined on both sides with fireproof metallic furring or wire-lath and plastered thereon with Keene's Cement. Two coats of good oil paint will protect the plastering on the outside against rain and dampness.



The stairway is lighted by a window in each story which could be replaced by bulls' eyes or walklights set in iron frames, to prevent the flames from cracking the window panes. On each side of the landing a door *a* leads to an open balcony protected by a iron railing, and from there through door *b* in the shops. (See plan). It is evident, that in the case of fire, the whole stairway is *shut off* from the flames and smoke as the doors *a* are wire-lathed and plastered on both sides and *hung* in such a manner as *to close by their own weight*, thus preventing the flames from entering the stairway, after the doors *b* were burned. The latter doors might be wire-lathed and plastered on the inside to make them more fire-resisting. It would be advisable to have a door in the brickwall separating both shops (marked *y* on plan), so that in case the exit to the balcony should be barred by flames, the occupants could pass into the other shop and reach the stairway from the other side, where they will be in perfect safety.

The stairway should have a ceiling, made fireproof by wire-lath or metallic sheathing. The dimensions of the stairway should be in

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accordance with the size of the workrooms and the number of people employed. Hoping that this device may be used freely for the safety of our workingmen, I wish only that it shall not be encumbered by any patent, gotten out afterwards by unscrupulous persons, trying to make money out of other people's ideas.

Respectfully yours, CHARLES H. RAU.

TO CEMENT A SLATE-ROOF.

NEW YORK, N. Y., April 21, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Will you kindly inform me to whom to apply for a preparation of cement or roofing material, which can be laid upon a slate roof of a church and fill the interstices of the slate so as to preserve the character of the roof and at the same time prevent leakage. By forwarding this information you will greatly oblige.

Yours truly, C. M. HARRIS.

[The slates should be laid in cement, spreading the cement over the top of each course, before laying the next. Webster's Elastic Cement is generally used for the purpose. Portland or Rosendale Cement may be used, but will wash down to some extent over the roof, which the Elastic Cement will not. Most slaters understand how to do such work. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

UTILIZING THE POWER OF THE NIAGARA RIVER. — At last there is a perfected plan, backed by money already subscribed, to utilize the power of Niagara — not of Niagara Falls, but of the waterhead of the river above the falls. Within a month the Niagara River Hydraulic Tunnel, Power and Sewer Company will begin the digging and blasting necessary for the building of its main tunnel, which will be about two and one-half miles long. The system by which the force of the river is to be used is familiar to all who have had occasion to interest themselves in the scheme. The ground above Niagara where the factories of the company are to stand has already been bought by the company. The estimate of cost for tunnel, twenty-four cross-tunnels, twelve raceways and bulkheads, and necessary masonry, timber, walls, etc., is 2,250,000 dollars. It is thought to be practical by the men who are undertaking to convey this power as far as Buffalo (twenty miles) for lighting that city with electricity, and new ways of using and conveying the inexhaustible force of Niagara River it is thought would be discovered in the future. One of the best-known banking-houses in Wall Street is deeply interested in this undertaking — *Invention.*

A GREAT LIGHTHOUSE. — The United States Lighthouse Board expects to open bids, according to the *Railroad Gazette*, next July for the erection of a lighthouse on the Outer Diamond Shoal off Cape Hatteras, which will be one of the most notable lighthouses in the world, on account of the difficulties in the way of its construction which have hitherto prevented the erection of any lighthouse there. The Lighthouse Board does not specify the method to be adopted by the builders, but it is generally understood that the design is for an immense caisson, 80 or 100 feet in diameter, which will be towed out to the shoal and sunk in place as rapidly as possible. The sand will be excavated from the caisson and it will be sunk until its edges rest upon the bed-rock, when it will be filled with concrete to a height some 30 feet above high water, and a lighthouse tower which will be 150 feet in height will be founded upon this mass. The caisson will be protected outside by a riprap of heavy granite blocks. The tower itself will be of steel. The placing of the caisson and the construction of the foundation will be exceedingly difficult on account of the constant interruptions which may be expected from rough weather, as the sea off Cape Hatteras is seldom long at rest. — *Invention.*

PICTURESQUE OLD BOGOTA. — This old Bogota somehow presents an appearance of unusual picturesqueness, though in a land where all things are as quaint as was Egypt in the days of Moses. Its narrow and crooked streets, winding uphill and down, are paved with the sharpest of small stones, that make pedestrians feel like penitential pilgrims on the way to Mecca with peas in their shoes, and in the middle of each street is cut a deep ditch or channel, through which the melted snows of the near-by mountains dance in noisy rivulets. The city has a population of something over 100,000, and in many respects is quite modern, in others fully two hundred years behind the times. Its white-walled casas are mostly of one story, with projecting roofs of red tiles and green-painted windows latticed like those of prisons, between whose bars one sees peering eyes — the beautiful, dark eyes of Colombian women, full of wondering curiosity at sight of "las estrangeras Americanas." Though built of adobe and unprepossessing in outside appearance there are many elegant homes in Colombia's capital, spacious and well furnished. The prevailing style of architecture is, of course, that which the Moors bequeathed to the early Spaniards, every house like a fort, its bare, blank walls built flush with the pavement, carefully concealing from the passer-by every trace of home life, while within are bloom and beauty, sunshine and cheerfulness. Those casas that exult in the luxury of a second story, and there are more of them in Bogota than one often finds in a Spanish-American city, have no windows on the ground-floor, the rooms fronting on the street being used for shops, warehouses and stables, for the proprietors and their families always prefer to live above. Even the biggest and grandest of these houses have never more than one entrance, and that consists of a pair of enormous double doors, often elaborately carved, opening upon a narrow passage paved like the street, which leads into the central court or patio, around which the house is built and with which all its apartments directly communicate. — *Washington Star.*

A WEALTHY AND LIBERAL ARCHITECT. — A Czech architect, Herr Hlavka, who some time ago contributed 200,000 florins towards the building of the Czech Academy, has now given half-a-million for a home for the orphaned and neglected children of Prague. — *Exchange.*

IN PRAISE OF VULCAN.

I. — THE FORTH BRIDGE.

When the wild men from Pentland's shaggy side
  Stared at the Fifeshire woodlands, did they dream
  This fiery dragon with its lungs of steam
Would make the heaven its pathway, and would glide
With cloud and sound above the wondering tide.
  Could they have hoped hot Haste would drive its team
  Straight for the gulf, and leap yon ocean stream,
High o'er Inchgarvie's isle, with double stride?
Nay, but the heart of iron was in the land,
  The soul of fire, the strength of lifted arm;
    The breath of wind was theirs; one thing alone
They knew not — this — how God himself had planned
    Mortals should conquer earth, and bind in one
  Our broken world, with commerce for a charm.

II. — THE EIFFEL TOWER.

The men who builded Babel day by day
  Saw the great city less, the plains more wide,
  Till God sent down confusion for their pride,
And tower and trench sank back to common clay.
Nor better fared the men who far away
  Beheld their harbor giant o'er the tide,
  For lo! earth trembled and the people cried,
And Rhodes' Colossus crashed into the bay.
But this transcendent tower of magic birth,
  That tames the lightning flash and mocks the thunder,
    Has set a star in heaven — with upturned eyes
  The nations meet, and pass in marvel under,
  And humbled, in the silence of surprise
They find a long-lost language of the earth.

— *H. D. Rawnsley, in Blackwood's Edinburgh Magazine.*

TRADE SURVEYS

ADDITIONAL speculative tendencies have been developed during the past few days, due to the expectations of a general expansion of demand. Railroad stock cliques are scheming, syndicate agencies are active, representatives of foreign financial operatives are busy. More money is flowing into the coffers of those who are scattering accumulations into Western farm mortgages. New York money-lending interests are shaping their policy as far as they can to have capital for emergencies, which their shrewd instincts indicate may arise. In Eastern commercial circles complaint is renewed that post-dating is becoming a greater evil, and in manufacturing channels there is a stronger feeling in consequence of this, against permitting an accumulation of goods. Improving railway earnings are made to serve the interests of a few speculative cliques, but the time has not yet come, in the opinions of the controlling heads, to attempt a raid on the pockets of the investing public. Favorable as are many of the indications of a general expansion of demand, there are enough warning signals on the other hand to keep production under control, and trading as well. The tariff agitation and the labor question have been unsettling many plans and calculations, but despite the sensational coöperation of daily newspapers, the long talked-of disturbance will be less than was feared. Organized labor is now as anxious to avoid and escape strikes as it was anxious, a few years ago, to enter on them. Behind all the threats and demands now made, there is a secret understanding that no actual strike is to be made only as an unavoidable necessity. The labor leaders on both sides of the water are managing with genuine ability and shrewdness. Mischief-makers have been weeded out largely, and men of more than ordinary ability are now at the helm. The real scope of the work to be done is now pretty clearly understood, and the uselessness of strikes and loud-mouthed vociferation is discerned. It is true, and herein lies the danger, that the rank and file may break away from the calm and conservative councils of the few, but every year lessens the danger of revolt. Employers of large bodies of men are quietly resorting to such protective measures as are within their reach, to protect themselves from any outburst of discontent.

For instance, the anthracite coal companies are carrying in first and second hands over one million tons of coal, and in some way or other a large supply of cheap European labor is gathered at certain points. Railroad managers, in like manner, manage to have many more men within call than can be furnished with full employment. The same is true of numerous smaller industries in New England and elsewhere. The iron trade is an exception, as the bulk of the skilled labor in that industry comes from abroad. Employers generally are in a better shape than a few years ago to meet labor's demands, and labor is less disposed to make arbitrary and unjust demands than ever, and more disposed to conciliate as a matter of prudence and necessity. The business world is full of animation. Trade and financial journals complain of low prices, narrow margins, lower freight rates and the like, forgetting that the prosperity of the masses is not always to be measured by the magnitude of middlemen's profits. The common people are living well, building their own homes and advancing in all that goes to make up manhood. The savings bank reports in a dozen States show this fact in bold relief. The great work being done through building associations' capital is inclined to be frightened at times. Investors scare at trifles. Just now there is need of saying a few words. The masses of the people are accumulating wealth. The middlemen, purely, are not having quite as good a time of it. Little firms and concerns are springing into existence faster than commercial agencies can keep track of them. The extraordinary railroad construction of the past five or six years has made a panic, otherwise probable, impossible. The energy and capital which has started ten thousand industrial beehives in a dozen new States opened up by railroads would have resulted in a congestion and an unbalancing of forces and activities that would have resulted disastrously. The railroad-builders have unwittingly done the country a great service.

S. J. PARKHILL & Co., Printers, Boston.

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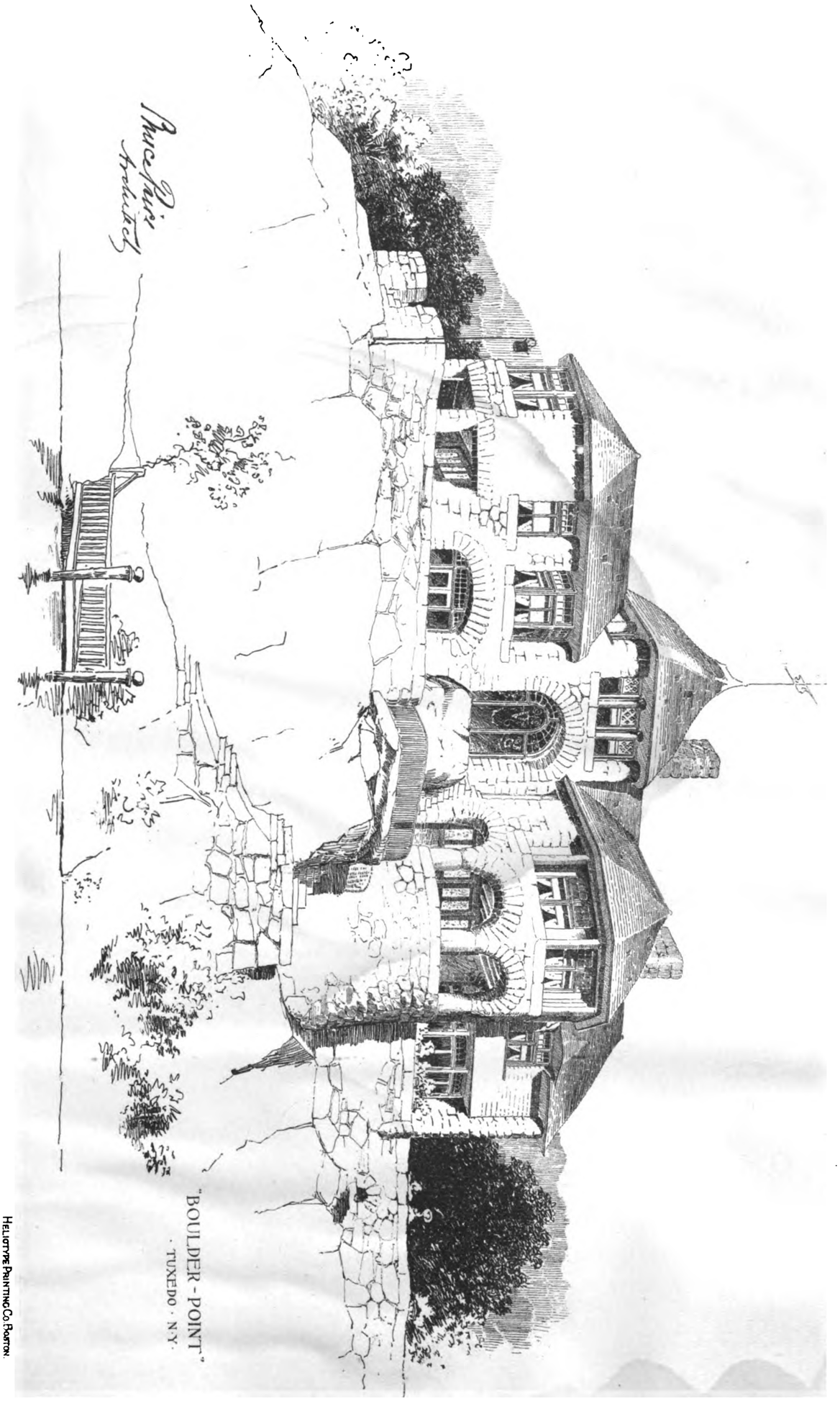

"BOULDER-POINT"
TUXEDO · N.Y.

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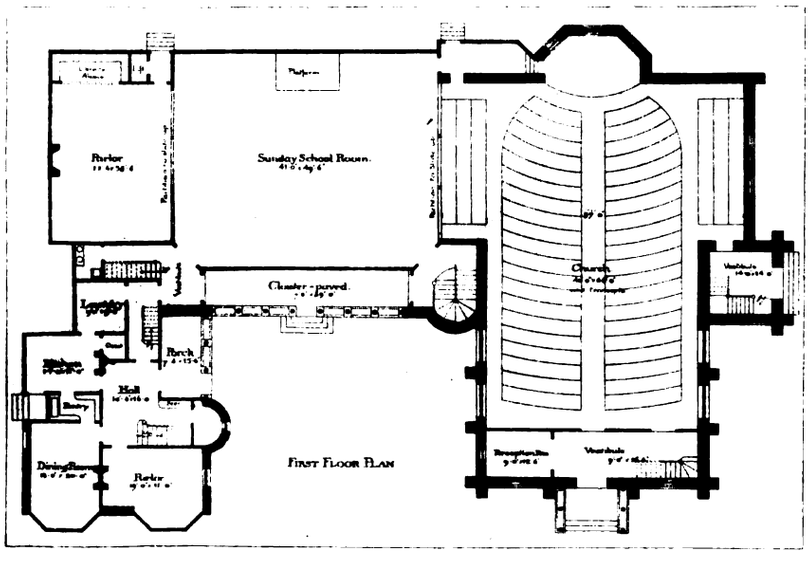

OF CHURCH

Walton

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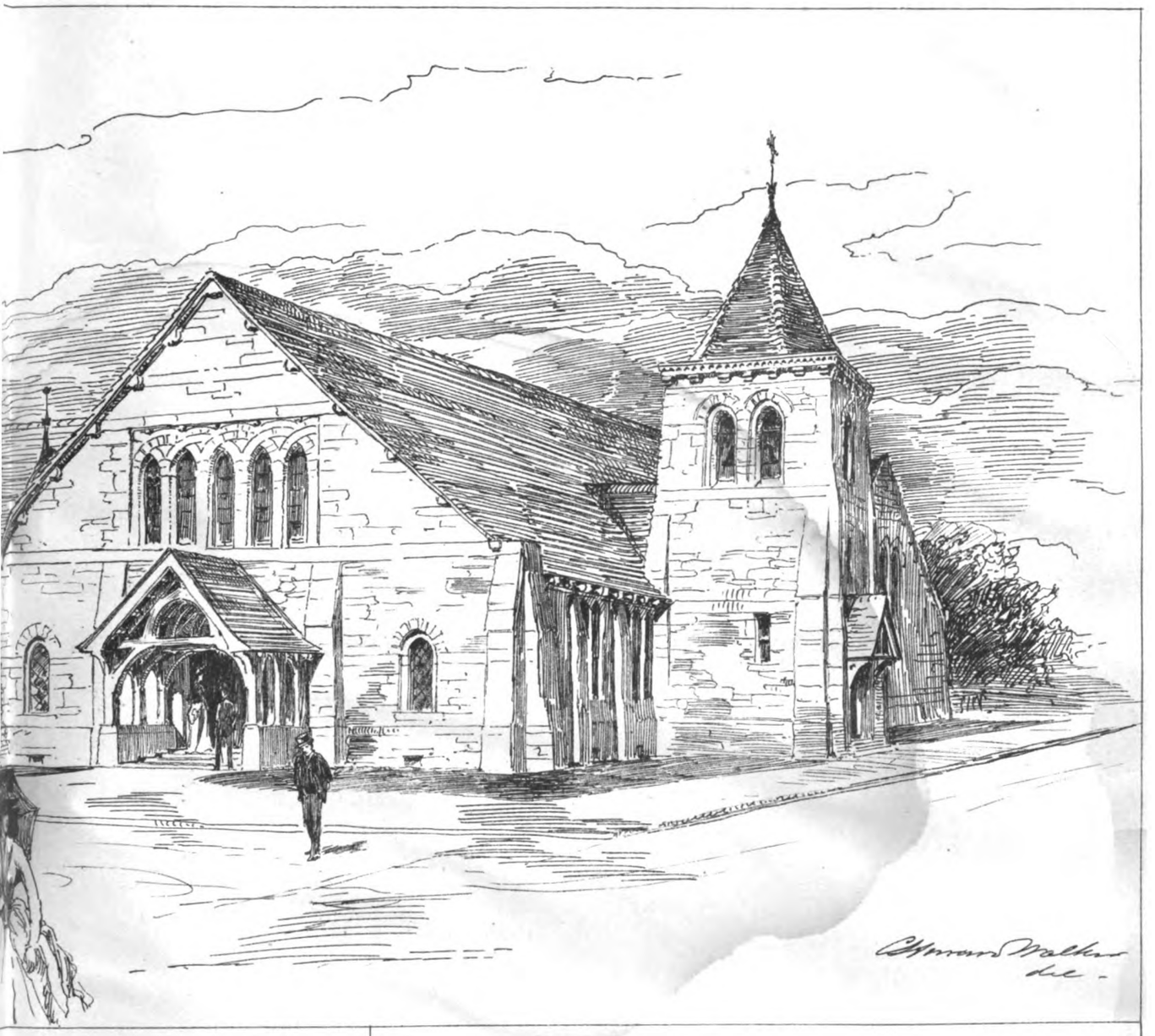
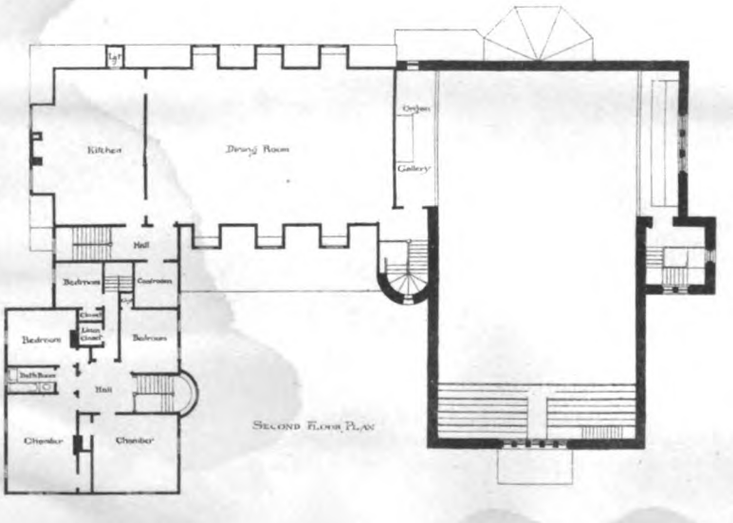


AT OAKLAND, CAL.

Best Architects

BOSTON, MASS.



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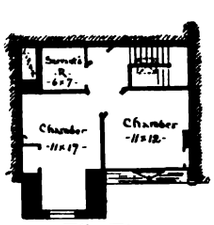
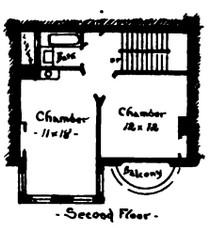
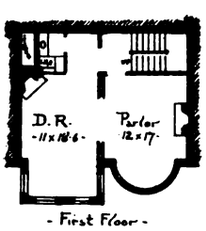
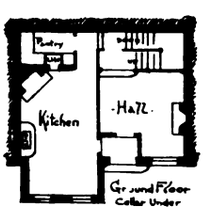
NEW CLUB HOUSE
FOR THE JUNIOR GERMANTOWN CLUB.

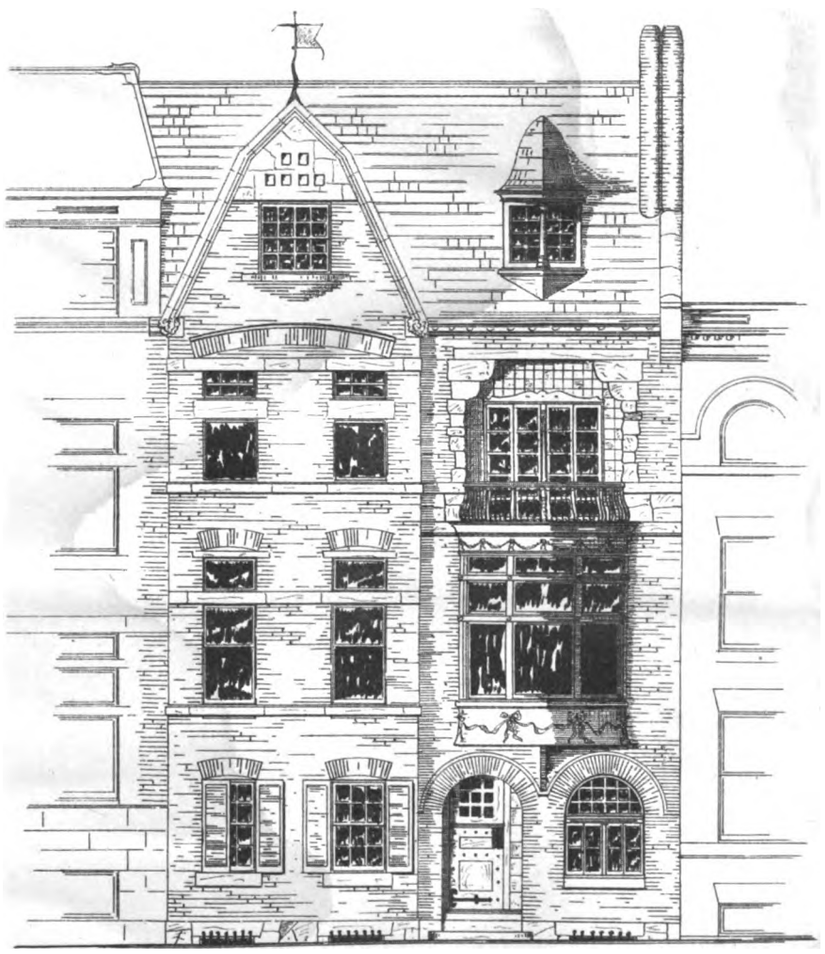
Geo. T. Pearson, Architect.
427 Walnut St. Philada.











HOUSE - on R. St - WASHINGTON - D. C. — W. Claude Frederic, Arch't - 1416 F St N. W.

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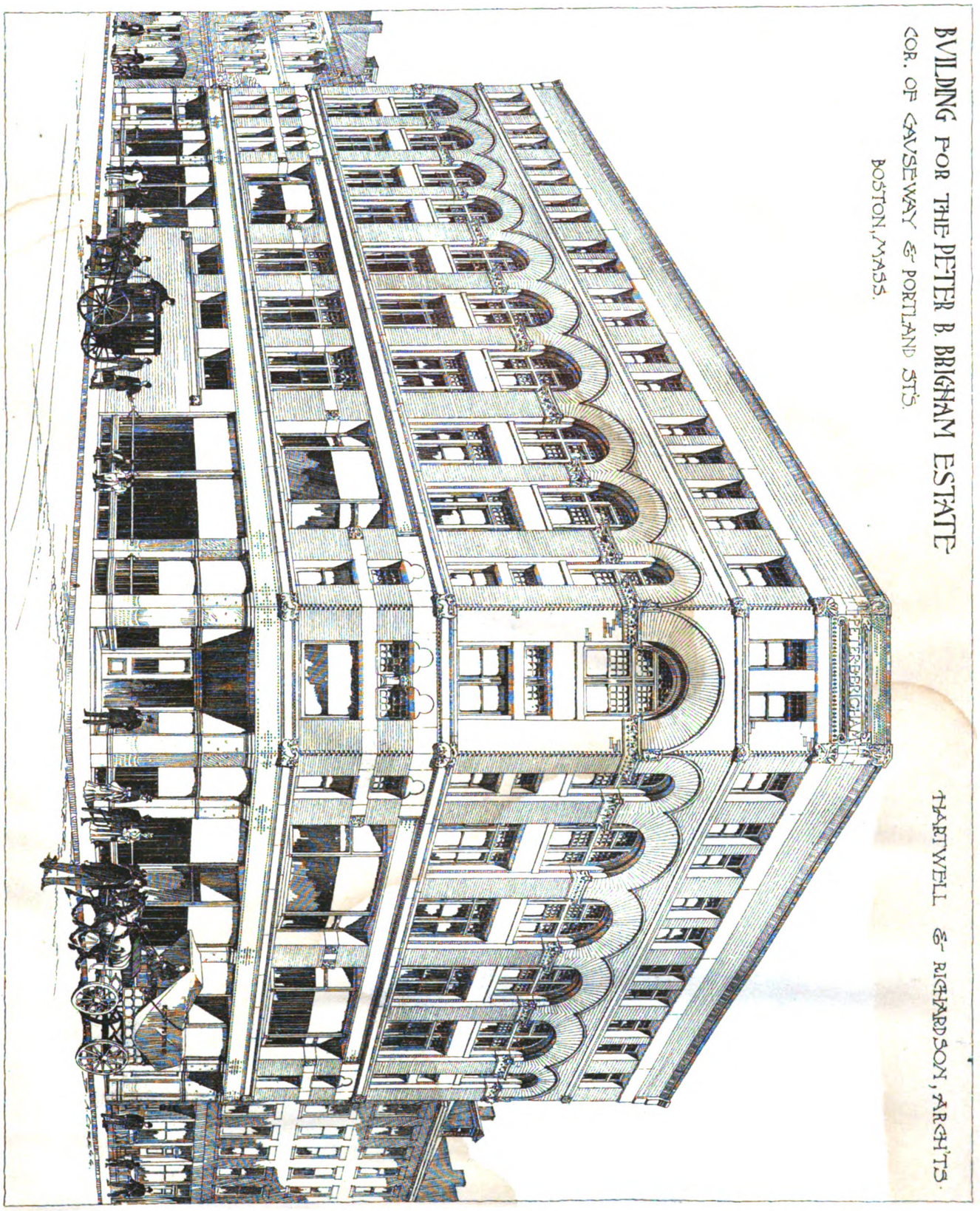

BUILDING FOR THE PETER B. BRIGHAM ESTATE

COR. OF GAUSEWAY & PORTLAND STS.

BOSTON, MASS.

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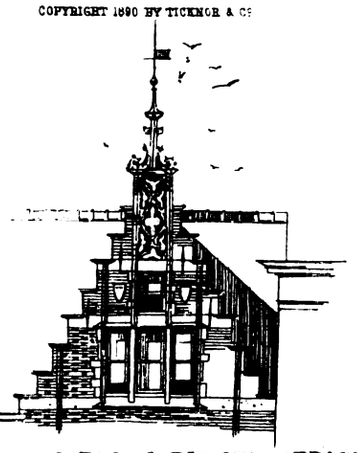
CARVED END OF OAK BEAM



GABLE - COPE AND STEWARDSON Architects

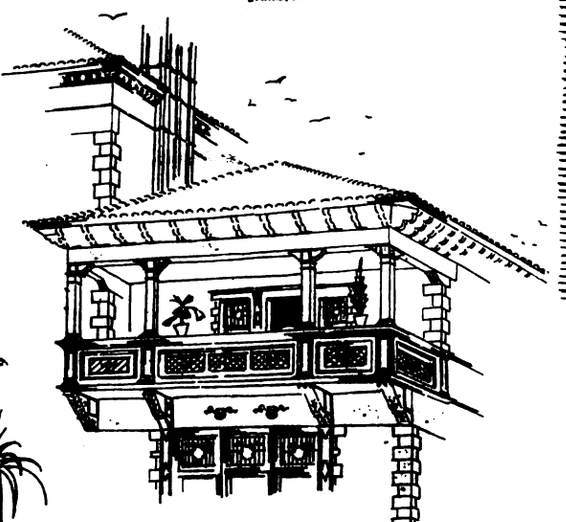
CARVED END OF OAK BEAM

DOORWAY - WILSON EYRE JR Architect.

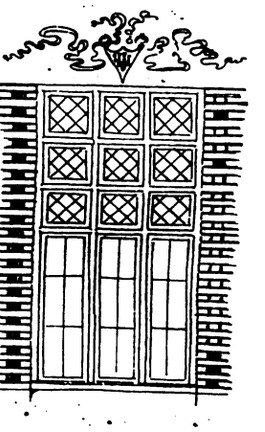
FROM OLD CAST.

PHILADELPHIA BITS.

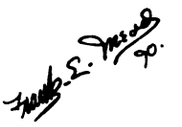
DORMER - NEAR CITY.



"LOGGIA" FROM ART CLUB.
FRANK MILES DAY.
Architect



WINDOW - CITY FRONT



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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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MAY 3, 1890.

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MR. JOHN T. WOOD, the explorer of Ephesus, died recently in London at the age of seventy. Mr. Wood was trained as an architect, and had won a considerable reputation, when he was engaged as architect to the Smyrna & Aïdan Railway, and, in that capacity, took up his residence in Asia Minor. Here he became interested in the antiquities of the country, and, after a year's service with the railway company, resigned his position to devote himself to antiquarian research. His most noted work was the excavation of the Temple of Diana at Ephesus, one of the most splendid and famous structures of antiquity, and, although the incendiary Herostratus and the pillagers who succeeded him had done their work effectually, he found remains enough to determine the arrangement of the building and to restore much of its detail. The manner in which this investigation was carried out gained Mr. Wood a high place among archæologists, and for many years he has been, perhaps, the principal authority on the architectural work of the Asiatic Greeks.

WE are glad to see that some one has awakened to the importance of providing the principal streets in our great cities with subways, through which gas and water mains, electric wires, and perhaps sewers, can be carried without the intolerable expense and annoyance caused by the continual digging up of the streets, which makes it impossible to use or maintain in this country the smooth, clean pavements which in Paris, London, Berlin, Frankfort or Milan are matters of course. All architects know that if a deep trench is dug, and the excavated material put back into it, years must elapse before the newly-filled tract will become as hard as the surrounding soil. A rule very commonly accepted is that the filled ground is comparatively soft, and subject to settlement, for twenty years, even though kept constantly wet during that time. It is evident, therefore, that when a ditch is cut through the middle of a street, a pipe laid in it, and the earth immediately shovelled back, compacted, not by ramming, which is at best a feebly efficient process, but by the miserable farce of squirting a little stream of water on it from a hose; and the paving-stones then reset, this portion of the street is sure to remain for years soft, uneven and muddy, to the loss and annoyance of all who use it. Even the authors of the mischief suffer from this careless and stupid method of working, for the pipes so laid are liable to be broken, and, buried in the foul, acid city soil, they rapidly corrode. Every one who has paid any attention to the subject sees that the proper remedy is to provide subways in the main thoroughfares through which all pipes and wires must be carried, and the paved surface left untouched. In the end, these subways would save a large sum of money, both to citizens and to the companies which used them, every year; and, as we believe, they might be constructed by private companies, if the legal right to do so could be obtained, and rented to telegraph, gas, water and electric-lighting companies, with great profit and advantage to all concerned; but it seems to be difficult to arrange for the surrender of rights in the public streets to private companies, and few cities in this country are prepared to incur the expense of building such subways for themselves. In New York, the State Legislature seems disposed to make a beginning toward providing the metropolis with something of the kind, but we will suggest, for the benefit of cities less prosperous than New York, that the problem might be gradually solved by having a proper scheme of subways laid out by a competent engineer, and requiring every telegraph, telephone, electric-light, power, heating and gas company that might wish to carry wires or pipes about the city, not only to use whatever subways might be already in existence, but to build a certain length of subway in addition, according to the official plans, and to the satisfaction of the city engineer. By this scheme, if a new electric-power company, for example, could have the privilege of using a subway already built, instead of having to go to the enormous expense of digging up, restoring and repaving the streets, whenever it wished to lay a new wire, or inspect an old one, it could probably afford to construct one foot of new subway for every ten feet of existing subway that it had the privilege of using; and, although the extension of the system would be slow at first, it would increase in geometrical ratio. A little calculation will show that on this basis, supposing the city to begin with a hundred feet of subway, in some street where it could be used to advantage for water-pipes, and supposing, which is not unreasonable, that ten applications a year were made for the privilege of laying wires or pipes, the total length of subway at the end of the first year would be two hundred feet. At the end of five years it would be thirty-two hundred feet; in ten years it would be nearly twenty miles; and at the end of the fifteenth year there would be six hundred and seventeen miles of subway, all, except the first hundred feet, constructed without expense to the municipality, and by means of a tax on the pipe and wire companies so light that there would probably never be an instance in which it would not be cheaper for them, considering deterioration and surveillance of their property, to build their proportion of subway than to dig up the streets in the manner which now prevails.

THE Executive Committee of the Grant Monument Association has, it is said, decided that the memorial to the great American general shall have the form of a hall, of monumental character, but large enough, not only to contain the tombs of General Grant and his wife, but other objects appropriate to a memorial hall. This resolution seems to have been taken with the praiseworthy object of giving architects, in the new competition, which will probably be invited, something more definite to work upon than the misty instructions of the last; but we hope the zeal of the Committee for improving upon the previous competition will not carry it too far. A memorial hall is all very well; and we should like nothing better than to see at Riverside Park a sort of Valhalla, where those Americans who deserved it might have their names commemorated by the side of our hero; but to specify, for instance, the form or dimensions of the memorial hall, especially if the dimensions were made too large, would be likely to result in the construction of something between a pagoda and a hotel, which would not satisfy anybody. Whatever moralists may say, architects know well enough that a thing cannot be conspicuously beautiful and conspicuously useful at the same time. If the memorial-hall destination of the structure is made too prominent in the conditions, the genius of Ictinus and Phidias might be lavished upon it without suggesting to the minds of the passengers on the river boats the idea that anything more than a new lunatic asylum was being erected. To be "phonetic," as Fergusson would say, and not only to

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attract sharply the attention of beholders, but to convey to them the impression that some unusual and solemn feeling is commemorated by the structure before them, the expression of utility must be kept very much in the background, or the commonplace suggestions of front-door, back-door, stairs, windows and elevator, which are inevitably associated in our minds with anything like a public building, will destroy what is most to be desired, the power of the monument to produce an effect at a distance. Of monuments purely phonetic, the colossal statues, such as that of Liberty at New York, the Germania statue on the Rhine, the San Carlo Borromeo at Arona, the Pilgrim Monument, and others, are the best examples, and these are certainly far more effective than any utilitarian house would be in their places. The effect of the Germania is, however, unquestionably improved by the architectural setting, and a still more purely architectural object, well placed, like the monument on the hill near New Haven, may be very noble; but it requires the highest talent and skill to find the happy mean, and care should be taken not to prevent the successful solving of the problem by fixing upon a certain kind of solution beforehand.

THE most remarkable bridge in New England, with by far the widest draw-span, if we are not mistaken, in the world, is said to be already showing signs of settlement, although it was only completed last October. This is the bridge over the Thames River at New London, on the Shore Line Railroad between Boston and New York. At the time of its construction, the bridge attracted great attention among engineers, and was illustrated and described in several foreign technical journals. The trouble appears to have begun in the western pier on the New London side of the river, which is said by the New York *Herald* to have sunk seven inches, cracking also the ice-breaker of stonework which extends northward from the pier. What the foundation of the pier is we are not informed, but the whole region is rocky, and there can be no great difficulty in securing a proper foundation, and underpinning or rebuilding the pier.

THE *Builder* has some sensible remarks about the compulsory examination for architects, which it is proposed to try again to establish in England. It will be remembered that a bill was introduced into Parliament last year, by which all persons desiring in future to practice architecture were to be required to prove their proficiency by an examination. The bill was not supported by any architects of prominence, and was rejected. This year, another attempt is to be made to get it passed, and the Royal Institute of British Architects, which had taken no notice of the scheme last year, was drawn in by compulsion, in a certain way, by getting twelve members to propose for discussion, in the manner provided by the by-laws, a resolution urging the establishment of compulsory examinations. When the time came for the appointed discussion, a counter-resolution was adopted, by a vote of about three to one, to the effect that "while not opposed to the principle of compulsory examination, as applied to those about to practise architecture, the Institute is of opinion that the difficulty of restricting by statutory powers the practise of architecture to those who have passed an examination is at present so insuperable that it is undesirable to make an immediate application for such powers." Some of the advocates of the examination made rather intemperate remarks on the subject, one of them, in particular, disparaging the Institute, and saying that in the city where he lived, and where there are many architects, only a very few, and those not the most eminent, were members of the Institute. This gives the *Builder* an opportunity for an effective retort. As it says, what the architectural profession needs now to raise its standing in the world is not examinations, but friendly coöperation. In the Institution of Civil Engineers, it informs us, there is not, and never has been, any test examination for admission; yet all young engineers apply for admission as soon as they can, and membership is generally recognized as an indication of professional ability. Among architects, however, membership in the Institute is regarded with indifference, and a large part of the profession seems to think that unity and loyalty to a common cause, that of the advancement and defence of good architecture, is a matter of no importance. The consequence is, as the *Builder* says, that, although the Institution of Engineers has no examination, the profession which it represents, acting through it with the force which numbers and unanimity of opinion give, "holds its position uncompromisingly before the public," while that of architecture, divided, disloyal and indifferent, has sunk into a public contempt, the depth of which is only occasionally revealed by some rude shock.

A NEW and very important observation is made in regard to the statues of the Parthenon pediments by Dr. Puchstein, Assistant-keeper of the Berlin Museum, who points out that these statues must have been cut with the aid of what Pausanias calls a "running drill," since the chisels used by the Greeks before the invention of this drill would not do the undercutting which the pediment groups show. In this respect, moreover, the pediment sculptures differ from those of the Parthenon metopes and those of the other principal Athenian buildings of the date of Phidias, as well as from the newly-discovered pediment group of the Parthenon at Olympia, which is with certainty ascribed to Phidias. From these indications, Dr. Puchstein concludes that the pediment groups of the Parthenon must have been cut and placed in position after the completion of the rest of the work, and he thinks they may have been executed by Callimachus, the inventor of the Corinthian capital, and the hero of the pretty story about the acanthus leaves growing up about the basket, with a tile on it, laid upon a grave. It by no means follows that, because Phidias did not do a certain piece of work, Callimachus must have had a hand in it; but Callimachus is said by Pausanias to have been the first to devise and use the "running drill," and the Parthenon groups must have been among the earliest works executed with the new instrument.

A SCHEME is actually under consideration for the construction of a railway up the Jungfrau, in Bernese Switzerland, one of the loftiest and most difficult of ascent of all the Alpine peaks. As the Jungfrau is remarkable for the force of the avalanches which rush down its sides at short intervals, a railway on the surface would be out of the question, and the new road is to ascend almost entirely in a tunnel. Here and there, the tunnel will be aired and ventilated by means of short galleries extending directly out to the mountain-side, and the trains will stop at these places, partly to allow the passengers to enjoy the view from the opening of the galleries, and partly to prolong the ascent, so that the change in atmospheric density from a pressure of about fifteen pounds to the square inch at the foot, to ten pounds at the summit, may not be too suddenly felt. Even with these stops, the journey will occupy only two hours. Although the view from the Jungfrau comprises nearly all Switzerland and a part of Germany, Italy is cut off from it by the still higher Monte Rosa range, and it seems a pity that the energy needed for tunnelling a railroad to the summit should not be kept for a line to the top of the Mount Blanc, which, though more than two thousand feet higher above the sea, is only about as high above Chamonix as the Jungfrau is above Interlaken, or even Lauterbrunnen, while the view from it is infinitely more interesting, comprising Switzerland and the Tyrol, portions of France, Germany and Austria, the Mediterranean, and Italy as far as the Apennines.

A DISCOVERY of ancient subterranean tombs, arranged something after the fashion of the Roman catacombs, has been made on the Mount of Olives, near Jerusalem. A Greek bishop, Epiphanios, probably fearing the consequences to historical and sacred sentiment of the opening of the railway from the sea-coast to Jerusalem, which is, we believe, already in process of construction, bought about twelve acres of ground, including one of the three peaks of the Mount of Olives, that known as the "Hunters' Garden," and, after surrounding it by a high wall, planted it with trees, and began the construction of a house and a small chapel. In the course of the excavation for the buildings, the workmen came across the remains of a group of tombs. Several shafts and capitals of columns, ornamented with acanthus leaves, in the Roman-Greek manner, were dug up, and the plinths on which they rested were fonnd. Between the plinths was a mosaic pavement, containing a Greek inscription in black on a white ground; and under the mosaic were found stone slabs, which formed the covers of tombs. So far, fifteen of these tombs have been opened. They appear to have been made partly by Jews, and partly by Christians, those attributed to the latter being situated in a group a little apart from the others.

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FIRE-WALLS.

CHICAGO, ILL., April 25, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In your issue of the *American Architect* for April 19, 1890, we notice in the communication from Chicago, that the writer in speaking of the fire-walls of the Farwell Buildings, says, that the walls consist "of a twelve-inch brick wall, lined on each side with a two-inch layer of concrete. The concrete veneering was applied by a case of boards being first built two inches from the brick, and the space filled with concrete, and the boards knocked away again after the cement had hardened."

Now, the above is entirely erroneous. We were the architects of the building and superintended its construction.

There was no brickwork at all used in the construction of these party-walls. But they were built entirely of concrete, made of Utica cement, sharp sand and stone-shale from the banks of the Michigan canal, which was brought on canal boats direct to the building, and walls made two feet thick in basement and ending at sixteen inches thick in top story.

A twelve-inch wall, with a two-inch scale of concrete on each side the entire height of the building, would, in our judgment, be a very poor wall. Respectfully, JOHN M. VAN OSDEL & Co.

[WE are glad to have this correction, and entirely coincide in the opinion that a twelve-inch brick wall with two inches of concrete on each side would be a very poor affair. It would be next to impossible to prevent the interior brickwork from settling, and throwing off the concrete scales. — EDS. AMERICAN ARCHITECT.]

FIREPROOF STAIRWAYS.

NEW YORK, N. Y., April 29, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In your issue of the 16th ult. you publish plan, section, elevation and description of a "fireproof stairway for factories and workshops," applicable also to other kinds of buildings, and which your correspondent, Mr. Charles H. Rau, claims to be something new.

Tenement-houses with stairways identical to those illustrated were built on Christopher Street, in this city, several years ago. Stairways on this plan have been built in Glasgow and Edinburgh, Scotland, for twenty-five years, at least; and in the barracks of the British army this kind of stairway is almost always the one adopted.

Mr. Rau need not fear "that this device may be . . . encumbered by any patent gotten out afterwards by unscrupulous persons trying to make money out of other people's (presumably his) ideas."

One disadvantage I can see in using this stairway in factories would be that the continuous lines of shafting, usually aimed at by engineers, would be interfered with. Yours truly,

DRAUGHTSMAN.

NOTES AND CLIPPINGS

LOST ARTS IN BURMAH. — Dr. Forchhammer has, according to a correspondent of *Indian Engineering*, just completed two large volumes of his archæological researches in Upper Burmah and the Arracan Division. The chief centre of his surveys were confined to Pagan, the ancient capital of the Tagaung dynasty, situated in the Pokoko district. The survey of the ruins of this ancient city was begun in December, 1888, and from inscriptions found in the Pegu district it was traced that remnants of the ancient city will be found on the hills east of Shweyzigon and Ananda Pagodas. From these interesting volumes we learn that Pagan contains a number of curiously constructed shrines built against the steep sides of ravines, and an interminable labyrinth of artificial caves perforating all the sides of the hills for miles and extending to the banks of the Irrawaddy, apparently constructed for the accommodation of Buddhist monks. Fac-similes of the inscriptions (some on slabs six feet high) have been copied. The inscriptions are engraved in Burmese, Talaing and Pali characters. The dates go so far back as A. D., 1059, to the close of the last century. Some of the huge granite pillars are traced to have been originally brought from Thaton after the overthrow of the Talaing dynasty. Some clay tablets bearing Nageri inscriptions have also been copied. The walls around the town are said to have been constructed by Indian masons; also a number of Hindu temples which exist in this locality. Most of the structures are constructed of brick, although many contain stone slabs to ensure stability. The main styles of the buildings are classified as follows:

(1) A pyramid, octagonal square or circular at base, solid brickwork throughout, no interior, often with lateral flights of stairs to the top.

(2) Temples with well developed interior and central chamber, over which rises a spire.

(3) Temples with interior galleries and ante-chambers on four sides with entrances from without, the hall being a massive square.

(4) Massive circular bell-shaped structures, similar to shrines in Ceylon.

(5) Subterranean monasteries with intricate passages and caves constructed some fifty feet below ground level.

The report concludes with specimen drawings of ornamental carving in stone and wood combined with beautiful variegated tiles. The painting and other decorative art exhibited on these temples disclose an art now lost by the Burmese. — *Invention.*

DETECTING LEAKS IN UNDERGROUND GAS-PIPES. — A German paper thus describes a method of detecting leaks in underground gas-pipes: Test-holes are sunk in the ground along the lines of the gas mains, and half-inch wrought-iron pipes about three feet long are inserted. In the upper ends of these pipes small glass tubes are placed, each tube containing a slip of paper moistened with chloride of palladium. The test-papers turn black under the influence of illuminating gas, the rapidity and distinctness of the reaction depending upon the strength of the palladium solution and upon the volume of escaping gas. Under the most unfavorable conditions, however, an exposure of the test-paper for a period of fifteen minutes is considered long enough to show whether or no gas is present. The test-holes should be placed about six feet apart, and should not reach below the line of gas-pipe. The main object is to penetrate the more or less compact surface material of the street, so that the gas in the ground has a direct and convenient means of escape. In many of the streets of Frankfort-on-the-Main, especially those having asphalt pavement, one-inch pipes lead through the asphalt and the underlying layer of beton, their lower ends extending to within a short distance of the gas mains. These escape-pipes are filled with pieces of sponge and are closed with cork stoppers. The pieces of sponge are renewed from time to time. The pipes have been found to overcome, to a considerable extent, the annoyance of digging up the streets for long stretches with the view of locating leaks in the main. — *Boston Transcript.*

THE NADRAI AQUEDUCT. — The great Nadrai Aqueduct in India carries a canal 150 feet wide or thereabouts across 15 arches of 60 feet span. In an account by the correspondent of *Engineering* it is stated that the foundations, which are on circular wells, all go down some 55 feet below the bed of the river which the aqueduct crosses. The 15 arches are divided by abutment piers into groups of five spans each, the abutment piers have each two rows of wells, and the single piers one row. Thanks to the simple expedient of building the work in a pit dug out of dry land through which the river was subsequently diverted, the work of sinking the 268 wells went on without interruption throughout the year. It is probable that no other well-sinking job has been so systematically worked out — and, indeed, in the beds of active rivers there is no such chance of careful administration — for as the river rises and falls the conditions to be dealt with change completely. The aqueduct carries the Lower Ganges Canal across what is known locally as a nuddee — *i. e.*, a water-course that draws its water-supply from the plains of Hindustan, and not like what are here known as the rivers proper from the mountains. The canal that goes over the top draws in ordinary years a revenue from the land it waters of some 50,000 pounds sterling a year, and a work that secures that revenue at a cost of 300,000 pounds sterling had much need to be pushed on with the utmost expedition. Fortunately, owing to favorable rain-fall during the four years that the aquedect was under reconstruction, the loss of revenue actually experienced was but a tenth of the total. Had the case been the other way, the loss of food crops in even one year would have far overtopped the price of the work. — *Providence Journal.*

THE ACCIDENTS ON THE EIFFEL TOWER AND FORTH BRIDGE. — The great monsters of mechanical skill and genius call for the sacrifice of a great deal of life and limb in their construction. The greater the engineering feat the more extensive is the loss of life. In the construction of the Eiffel tower, for instance, twenty-six lives were lost, according to the official returns of the French Government; but it is said that this number would be largely augmented if the names were given of men who died from injuries received during the construction of the tower and of others who were killed and whose deaths were not reported owing to the hue-and-cry which was raised after the first two dozen lives had been sacrificed on the great structure. The number of men who were injured during the construction of the Eiffel Tower has been placed at 6,000. This enormous showing is accounted for by the fact that every injury was reported and registered which received treatment from the official surgeons. When a man bruised his finger he went to a Government surgeon to have it dressed, and a clumsy workman thus got on the list a dozen or two times a year. Serious injuries were a very small proportion of the whole. On the great Forth Bridge in Scotland, a list of forty lives lost has been published; but there is no record of injuries. — *New York Sun.*

AN OLD LONDON HOUSE. — Another of the old houses in London is threatened with demolition; though considerations not æsthetic may save it, after all, from the final fate. Curiously enough, neither Timbs, Hare nor Thornbury mention it; we gleaned our own first brief hint from a kind "sentimentalist" in the press, who made an unnoticed protest against the destruction of just so much of an object-lesson in literature and history. The house is not far from St. Paul's, between Cannon and Upper Thames Streets, on the east side of College Hill, and numbered 21 and 22. It has a wide, low stone portico, mortared, with ample double arches, surmounted with elaborate carvings, said to be the work of Grinling Gibbons, as is indeed likely; the two entrances open directly upon the street. Inside the great gates, with their ancient bolts and chains, are the square paved court-yards, one much finer than the other; and beyond again, the dwelling itself, of brick, and flat-walled, without gable or bow-window, between a glaring recent building and the church. A sign hangs out, advertising offices to be let, and it is evident that offices have been let there any time these two hundred years. The place seems in good repair; there is a pleasant seventeenth-century entrance hall, with carven garlands intact over the doors and on the ceilings. Overhead is the staircase, where swords jingled, and long silks, in a kindred rustle of laughter, swept the floor, on the way to a minuet; beneath are the vaulted cellars, where Dryden's Zimri kept his wine. For the memory which pervades the lonely place is just that of the vagabond Duke of Buckingham, nearly first in his

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brilliant worthlessness, of the vagabonds of his day. The house was his house, and it rings with the arraignment of his first poet's tingling lines. It is a still place, where little traffic comes, left to clothe itself in soft yellows, and dream of the "dancing, drinking and unthinking time." It might be hard for anybody, even an American with money and a sense of the picturesque, to get up an enthusiasm for the reprobate, whose child-effigy, over his murdered father's tomb in the Abbey, where he also lies, is handsome enough for an angel's. Not Dryden alone, but Pope, afterwards, did him immortal honor in lines too famous to quote. As everybody knows, the second duke died in a village inn, poor and alone. Whatever he was (and the same praise may be given to every courtier his contemporary, and to the King who saw fit gravely to reprove him for his atheistic talk), he was no hypocrite. When a clergyman of the establishment called to see him, and asked of the dying firefly in what religion he had lived, he replied gallantly: "In none, I am well pleased to say; for I should have been a disgrace to any. Can you do me any good now, bestir yourself and do it!" Any one who has had occasion to be wearied of cant might wish 21 College Hill preserved as a beacon to warn wit and strength from base courses, and to encourage the Pharisees in the sole virtue saved from the shipwreck of a man. There is a motto on the arms in the immediate neighborhood: *Hinc spes effulget.* Hope and other good rays must always shine from honesty, even when it belongs to a George Villiers.—*Louise Imogen Guiney, in Boston Post.*

Destruction of the Church of the Holy Sepulchre, Jerusalem.— In the year 1807 the Armenians appeared but as strangers in the Church of the Holy Sepulchre; they possessed only a poor chapel situated in one of the galleries of the nave. The nakedness of this chapel contrasted with the wealth of the nation. Besides this it was ready to fall into ruins, and the Armenians had several times solicited permission to repair and embellish it. After many ineffectual petitions they determined to set fire to their chapel — to destroy it — in the hopes that the privilege of rebuilding their fallen sanctuary would be more easily obtained. They thought that they could master the flames so as not to spread beyond their chapel; but the fire speedily reached all the galleries, and sprang up to the dome of the church; the Corinthian columns which supported the nave were thrown down; the dome of the church, which was made of cedar, could not long resist the fire — it fell with the upper part of the nave, and in its fall crushed the Holy Sepulchre. The flame spread to the Calvary, and all the altars were burned. The tombs of Godfrey of Bouillon and of Baldwin disappeared in the course of the general destruction; eye-witnesses have assured me that the tombs of the two kings had been spared by the fire, and that they were destroyed by the Greeks themselves in the midst of the confusion of the conflagration. The tombs of the two kings were as it were the Palladium of the Latin monks; they were the glorious title-deeds of the monasteries of the Holy Land; and the Greeks, the enemies of the Latin convent, wished to get rid of these monuments. At present two stone benches covered with a mat fill the place of the two tombs; the ashes of Godfrey and Baldwin, mingled with the ashes and rubbish of the fire, profaned and cast to the winds, are lost from the soil of Palestine. — *M. Pomjoulet, in The Architect.*

Catania.— Perhaps 90,000 souls exist in Catania, The palaces which border her principal streets are very new, splendid and great; perhaps the Biscaria palace which houses vast stores of Greek sarcophagi, terra-cottas, vases, and sculptures excavated from the lava, being the most imposing. Then there is the Marina, where the lowly gather and listen to the music of government bands, a filthy place much loved by the lazzaroni. But the Bellini garden, out on the heights towards Etna, is surpassingly beautiful; and in this you will see military officials resplendent in uniforms and decorations, lords and princes covered with insignia of rank, all the really interesting aristocracy of Catania, and truly the most winsome, soulful-eyed, empty-headed women of Sicily. Of the Græco-Roman remains, the theatre can be visited by the use of guides and torches. The ancient Odeum is near; and in Archebusiri Street will be found what is left of the Roman amphitheatre. Under the Piazza del Duomo, adjacent to the great cathedral, are the Roman baths; but the best preserved specimens of these are seen underneath the Carmelite church, where there still remain, in marble, the warm bath, the hot-water bath, the vapor bath, and the fire-room and the disrobing-room. There are many mediæval half-ruined structures of interest in Catania; while the unfinished monastery of San Nicola is, excepting that of Mafra in Portugal, the largest and most imposing in all Europe — *Commercial Advertiser.*

Drainage of Houses in India.— Mr. Framjee Aderjee, of 26 Ezra Street, Calcutta, is urging upon the Calcutta Municipality, with all the enthusiasm of an inventor, says *The Indian Engineer*, a simple method he has devised for preventing the accumulation of germ-bearing matter in drains. According to the system at present in vogue, the water-tanks are within the houses, and the drains are flushed or not according to the carefulness or otherwise of the occupants. Mr. Framjee would place the tanks outside, and have the water let on regularly by Municipal servants. Then, the street drains now have a small stream of water running through them night and day, which never fills the channels, and therefore, cannot clean them out. According to Mr. Framjee's plan, the water would be allowed to collect in tanks, and would be let into the drains at intervals in such a volume that all refuse would be carried before it. Mr. Framjee has a model of his system, in which the working is clearly shown, and the contrivances are also shown by which an overflow of water may be prevented. So far the plan seems excellent, and its adoption may be recommended; but there is a further and totally distinct part of the plan, which the inventor is unwilling to disclose at once. It is a plan for brushing the drains and so preventing the adhesion of sediment to bottom and sides. Nobody denies that this, if it could be done, would be a desirable thing, and Mr. Framjee thinks he can do it, and at the same time effect a saving instead of an increase in the present cost of cleaning the drains. — *Invention.*

Sarcophagi Found in Italy.— Near Viterbo, in the district of Colleno, a chambered tomb has been discovered, with a vestibule adorned by two columns. The cell contained two sarcophagi of travertine, in which were found a golden ring and some gold thread, remnants of the rich clothing of the deceased. Between Vetralia and Capranica a marble sarcophagus has been unearthed, adorned with bas-reliefs, representing the myth of Theseus and Ariadne, of severe and simple style. — *Exchange.*

The Empress of Austria's New Palace at Corfu.— The Empress of Austria, is building a magnificent Pompeiian Palace at Corfu, which will have cost nearly half a million sterling by the time it is ready for occupation. It is on a charming site on top of a steep hill, and is being constructed of marble brought from Carrara, while the interior is to be decorated with the rarest woods. The gardens will be laid out in terraces with fountains, and both the house and grounds are to be illuminated by electricity. Three hundred men are now employed on the building operations. — *Boston Post.*

TRADE SURVEYS

The remarkable indifference manifested by money-lenders and financial authorities throughout the East to the growing and even threatening demands of the silver inflationists in the West is due more largely to political considerations than anything else. There is less confidence in the monometallic idea than formerly existed. People of all classes now begin to have less fear of an abundant supply of silver money, and paper money based upon silver, than years ago, and there is a disposition to at least try the experiment, since it seems that the experiment cannot be avoided. Powerful political sentiment in the West favors a currency expansion, and the wise heads in the East see that it is to come, and are preparing to adapt themselves to it. Very many interests are identified, temporarily, at least, with this movement for an increased supply of money, and these interests are anxiously awaiting a change of policy which is to bring them opportunities for greater speculative effort. Old theories and standards are being either revised, or entirely upset and replaced by new ones concerning money and its functions. Nearly all the larger railway systems are furnishing good reports of traffic and earnings. Railway securities are in better request on both sides of the water, but, at the same time, public confidence in these securities grows but slowly. Financial and business interests are anxious to see what Congress will do with reference to the railway and other important questions, knowing that the actions of that body are not always directed by the highest degree of wisdom. The industries throughout the country have been more or less unsettled by the labor agitations of the past three or four months, but, now that the crisis is over, plans which have been held in abeyance for a long time will be developed and vigorously carried out. A great deal of new work will be heard of within the next thirty days. Manufacturers in nearly all of the larger cities have been contemplating an expansion of their producing capacity, but have held back until this time; but their work, when presented, will be most urgent. The railroad-builders have in contemplation a great deal of construction work, and, now that the way is clear, they will push it through. Throughout New England, a great deal of small house and shop building will be done. The industries of these States are in an exceptionally prosperous condition, and scores of establishments have more work than they can conveniently attend to. The output of our industrial establishments generally is greatly in excess of last year; the exceptions to this rule are insignificant.

The paper manufacturers are perhaps not as confident of a booming demand as they were a year ago, but nearly all the paper-mills are busy, and stocks are not depressing prices. The makers of machinery and electrical supplies are exceptionally busy. The boot and shoe manufacturers have had a very good winter and spring trade. The hardware manufacturers have done well. In the Middle States a similar condition of things exists. So far as the iron trade is concerned, there has been no lull in demand, although prices have declined to the lowest point known for a year or more. The steel rail-mills in Pennsylvania are crowded with orders, and there are now inquiries in the market for over 100,000 tons of rails, according to reliable late advices. Bridge-building material is in very urgent demand, to cover requirements created by the erection of several large bridges over Western rivers. The coal-producers of the authracite region report an improving demand. The bituminous coal-producers along the Allegheny Mountains are producing over 250,000 tons of coal per week, and marketing every ton of it. In Western Pennsylvania a satisfactory condition of things is reported with reference to the great industries located there. The possibility of a general strike among the iron and steel workers is contemplated; but it is not yet certain that the employers in that industry will be forced to face such an emergency. Throughout the Ohio Valley the greatest activity prevails in iron, steel, coal and building interests; all the smaller industries there are thriving, owing to the wonderful development that has been made in West Virginia, Kentucky, Tennessee, Ohio and Indiana. Within the past year or two the Ohio Valley has regained much of the activity which was lost at the time when the Ohio River ceased to be a grand highway, owing to the active competi ion of the railway lines between the Allegheny Mountains and the Mississippi. River travel is now increasing, and that our inland water-ways are to be used still more is proven by the immense amount of work now in hand at inland boat-yards. Throughout the entire valley agriculture is also prospering. Eastern manufacturers and jobbers report, from time to time, a greatly increased demand for all kinds of machinery and manufactured products from the region of country lying 500 miles west of the Mississippi River. Throughout that belt scores of small towns have sprung up, there has been a wonderful development of small manufacturing interests, and the section is receiving the benefits of an outflow of capital and population similar to that with which the South has been favored in recent years. Real-estate is advancing steadily. The railroad companies are finding it profitable to construct much new mileage; labor is being attracted to this section, and the manufacturing interests located there are prospering as they are perhaps nowhere else in the country.

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RELIGIOUS ARCHITECTURE.[1] — IV.

II. RELIGIOUS ARCHITECTURE OF ANTIQUITY. — ASSYRIA, PHŒNICIA AND PERSIA.

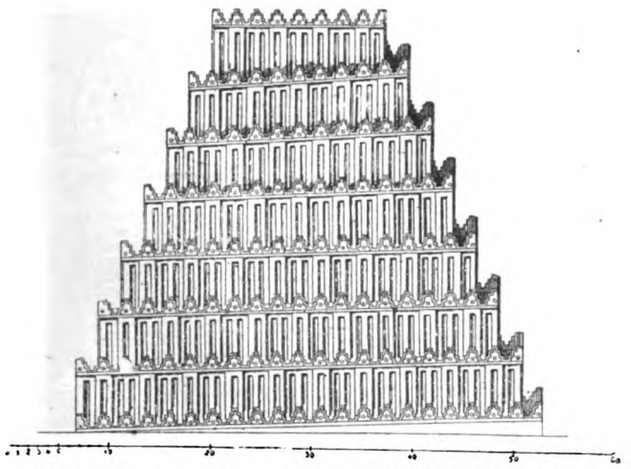


Fig. 1. Elevation of the Observatory Temple at Khorsabad (8th Century B. C.). After Place and Thomas.

THE ancients applied the term Mesopotamia to the land lying between the rivers Tigris and Euphrates, and extending from the Persian Gulf northward to the sources of these streams. This vast region comprised, in the south, Chaldea, with Babylon as its capitol, and in the north, Assyria with the seat of government at Nineveh. The population was of Semitic descent. On the west stretched the deserts of Arabia, while to the east the country was occupied by the Elamites, and by the Medes and Persians, two Aryan tribes derived from a common origin.

The history of these peoples presents an almost unparalleled record of incessant warfare; and hence there grew up in the bosom of the Semitic family a vigorous, belligerent and conquering race.

At the dawn of history the country was under the rule of a Median dynasty, which shows that the Medes had previously subjugated Chaldea. The precise date of this conquest, 2295 B. C., is learned from the ulterior inscriptions of Asshurbanipal. About 2047 B. C., a Chaldean dynasty recovered the power and held it down to the moment when the Egyptians of the eighteenth dynasty subdued all Mesopotamia.

Chaldea continued under the domination of Egypt, after the sixteenth century B. C., while the northern division succeeded in reconquering and maintaining its independence. The Assyrians gradually invaded Chaldea, and driving back the Egyptians, at length, in the fourteenth century B. C., became complete masters of the country. Babylon attempted, by numerous revolts, to escape from their yoke; but, notwithstanding many bloody struggles, it remained under Assyrian supremacy down to the seventh century B. C. The conquerors pushed their expeditions in all directions, along the shores of the Caspian Sea, in Armenia, in Cappadocia, in Syria and in Phœnicia. It was during this glorious period, in the eighth century B. C., that Sargon founded the city of Khorsabad, whose ruins have been discovered and of which we shall have something to say farther on; it was at this time also that Sennacherib built the palace of Koyunjik (Nineveh), which Layard was able to unearth and restore.

In 632 B. C., the Scythians invaded the country, entirely ravaging it, with the exception of the fortified cities, and extending their incursions to the very frontiers of Egypt; then they retired to their deserts and were superseded by the Medes, who occupied Assyria as well as Chaldea. Nineveh was destroyed at this time.

Under the Medean monarchs, and later under the Persian, the rival city of Babylon reared its walls and grew in importance and splendor; in the sixth century B. C., it was the largest and most beautiful city of Asia. It began to decline after the conquest of the country by the Greeks, and the Parthian invasion completed its ruin.

The remains of Mesopotamian religious architecture are unfortunately in a very bad state of preservation. The edifices were built of unburnt brick, and the action of rain, wind and sun has converted them into rubbish-heaps. The explorer can only guess at their existence by the discovery of mounds in perfectly level plains, whose presence there cannot be accounted for by the geological character of the soil.

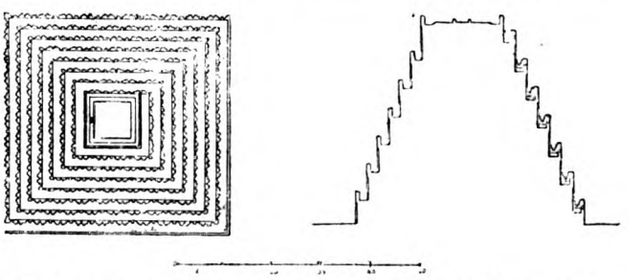
In Chaldea, we may call attention to the ruins of Warka, Abou-Shahrein and Mougheir, of which we shall speak hereafter, and of Tell-Loh; also to those of Babil, El-Kasr and Tell-Amram on the site of Babylon; in Assyria, we note especially those of Birs-i-Nimrud and of Koyunjik, formerly Nineveh.

But the most important of all these remains, those which archæologists have been able to turn to account in reconstructing the edifices of Assyria, are the ruins of Khorsabad, near Mosul and ancient Nineveh. Originally discovered by Botta, they were first seriously explored by Place and Thomas who completely unearthed them. They proved to be the remains of the gigantic palace reared by Sargon.

On one side was discovered a terrace-shaped structure, which, from our especial view-point, furnishes a most interesting subject for study.

The purpose of this edifice has not yet been satisfactorily determined. Place and Thomas are of the opinion that it was an observatory; it is, however, generally believed to have been a temple. Yet the one destination did not exclude the other, as is shown by the well-known religious ideas which the Chaldeans connected with the observation of the stars. In any case the discovery of two stone altars in the ruins unquestionably determines, even according to Place, the religious character of the structure.

A staircase, or inclined way, wound around the tower (Figures 1, 2, 3), as indicated by the elevations and sections. The path encircling the first story measured 564½ feet in length; the slope was only about 1½ inches to every 3¼ feet. As the ascent was made the distance around the pyramid



Figs. 2 and 3. Plan and Section of the Observatory Temple at Khorsabad.

diminished, and, since the stories were of the same height, the slope became steeper; at the summit, however, it was still only 2¾ inches to every 3¼ feet. The terrace at the top was 39.37 feet square; it was there that the altars must have been placed and that the priests were stationed during ceremonies.

There are four stories still in existence; the total number was doubtless seven; this would tally with the descriptions of antiquity and would also make the height of the pyramid equal to the side of the base, the usual proportion. The faces of the lowest story were stuccoed with a white coating, while the next story was black, the next red, and the one above that blue. And, in fact, Herodotus writes: "The Medes constructed the mighty and formidable ramparts of the city at present called Ecbatana, where the walls rise behind one another. This disposition was favored by the slope of the ground, which is such that each wall surpasses the one in front by the height of the battlements. The battlements of the first wall are of white stone, those of the second are of black stone, while those of the next are purplish; they are blue in the fourth and vermillion in the fifth; the battlements of the last two walls are painted, the first in silver, the next in gold." This variation in the coloring by stories was then the customary thing in Assyria, and we need not be surprised to find it on the tower of Khorsabad, and in such complete harmony with the tints described by the ancient historian.

The brick steps were intact; the remains of the battlemented parapets which originally bordered the inclined path have been discovered.

Not far from this tower, and in the huge mass of buildings constituting the palace and city of Khorsabad, we find the remains of a temple which seems to have been left unfinished.

Only a few varieties of material were in use; first of all, and for the heavy part of the work, crude clay was employed; this was puddled and mixed with straw which had been

[1] From the French of P. Planat, in Planat's "*Encylopédie de l'Architecture et de la Construction.*" Continued from page 53, No. 748.

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trampled fine by men and horses; it was cut and moulded, and then dried in the sun for a long period, sometimes for several years even. And yet stone was not wanting in this region; the Assyrians understood working and using it, for enormous blocks of it are found in a few retaining walls and flags, and especially in decorative sculptures. But, as the Ninevites came originally from Chaldea, they had brought with them southern customs; and in Chaldea clay was the only feasible material; besides it answered perfectly and cheaply all climatic requirements. Even now, thick layers of earth are the most effective protection against the torrid suns which parch all this country. In the Assyrian constructions the walls were of extraordinary thickness.

The manufacture of burnt bricks had likewise been imported from Babylon or Chaldea; all ancient historians moreover agree in attributing the invention of this building material to the Chaldeans. It appears to have been of excellent quality. The dimensions of the bricks were about 15⅝ in. x 15⅝ in. x 2⅜ in., for the upper courses of construction, and 12½ in. x 12½ in. x 4⅛ in. for the lower courses. For vaultings, bricks moulded in special forms were employed.

The enamelled bricks, for polychromatic facings, were of somewhat different sizes. Limestone was used for mural casings and for flags; it was of two qualities, one soft and the other very fine, like hard, firm rock.

Gypseous alabaster, a substance peculiar to Assyria, was employed on surfaces, often of considerable extent, for architectural or sculptural decorations.

Stucco materials, with a base of lime for the white portions and of bitumen for the black, were applied in coatings to all parts that were not covered with chisellings.

The system of foundations was exactly the reverse of ours. Instead of making excavations, the Assyrians began by building an enormous mound of unburnt bricks, which was often carried up 45 or 50 feet in height. The walls, which were likewise of unburnt brick, were erected on this. When we speak of walls, the reader should not picture to himself constructions in the least like our walls. They varied in thickness from 25 to 80 feet, and the thinnest partitions were 9 to 10 feet through.

Mere climatic exigencies are insufficient to account for such exaggerated dimensions; in seeking an explanation of these, we must remember that the materials employed were of mediocre quality, and above all that manifold forms of vaulting were in use for covering all interior spaces. These vaults were necessarily made very thick to keep out the heat. The thrust would consequently be considerable, and it would be impossible to support it, especially with insecure material, unless the walls were of a thickness that seems to us enormous. Moreover, the Assyrians constantly made use of buttresses to complete the necessary supports, especially in the basements, where it was to be feared that the masses of crude clay might slump and become, despite the masonry, veritable rubbish-heaps.

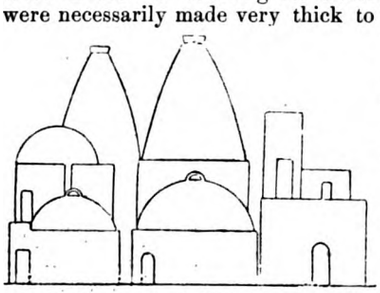


Fig. 4. Dome-covered Edifice; a Bas-relief from Koyunjik. After Layard.

There is no reason for assuming that wood played any important part in the ceiling of halls; on the contrary, entire sections of vaults have been discovered, with the intrados still revetted with stucco or enamelled bricks. In fact, the vault was employed almost everywhere.

The dome was very probably known to the Assyrians, as is shown by several bas-reliefs (Figure 4) figuring dome-covered edifices, both spherical and elliptical. Adequate remains of these have not yet been discovered, although several square rooms at Khorsabad seem to have been covered in this way. It is probable also that some roofings consisted of semicupolas or open niches (Figure 5), reaching above the walls and so oriented as to shade one side while admitting the diffused light on the opposite side for the illumination of the interior.

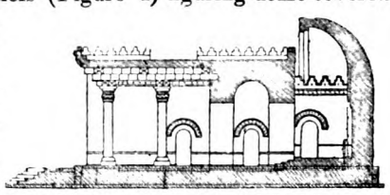
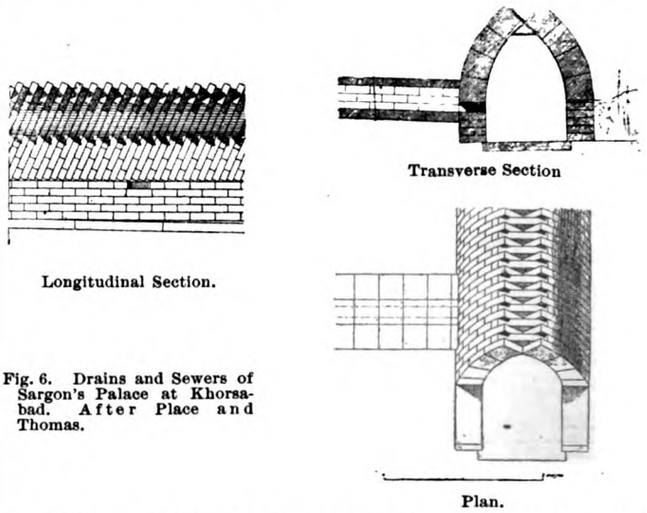


Fig. 5. Assyrian Semi-cupolas. After Place and Thomas.

But the most remarkable constructional peculiarity is to be observed in the divers subterranean conduits or drains which were built to carry off the water. The study of these demonstrates that from remote antiquity the Ninevites put in use the various forms of the vault — flat, rounded, semicircular, surbased, pointed and ellipsoidal — and all built in a very satisfactory manner.



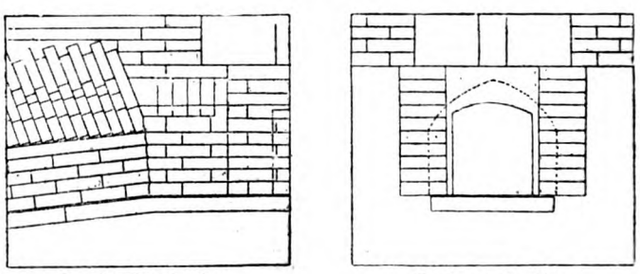
Transverse Section

Longitudinal Section.

Plan.

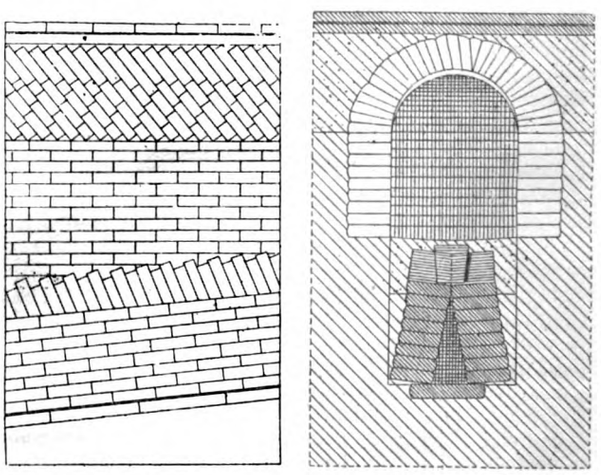
Fig. 6. Drains and Sewers of Sargon's Palace at Khorsabad. After Place and Thomas.

Without entering into minute details, which will be found set forth in the work by Place and Thomas, entitled "*Ninive et l'Assyrie*," we will call attention to several of the pecularities of these varied dispositions (Figures 6 to 9). In the principal drain (Figure 6), it is noticeable that the body of the brick is laid — not following the direction of the haunches or flanks of the vault, so that a vertical section shows a vertical section of the brick — but obliquely; the bricks of the same section, instead of touching on their broadest surfaces are in contact on their smaller sides. We shall see this same disposition reappearing several different times in more advanced ages, in Byzantine architecture, but it was important to fix its high antiquity.



Longitudinal Section. Transverse Section.

Fig. 7. Depressed Vaults in the Drains at Khorsabad. After Place and Thomas.



Longitudinal Section. Transverse Section.

Fig. 8. Semi-circular Vaults in the Drains at Khorsabad.

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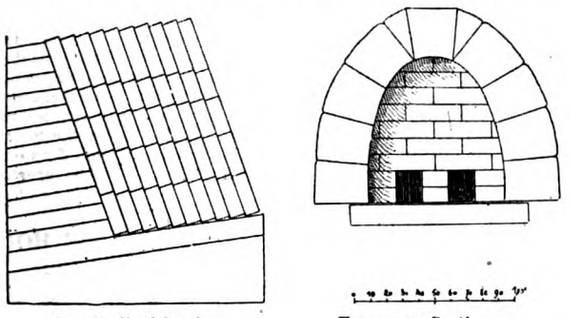
It will be remarked that only every other course of bricks was closed at the crown of the vaults. The filling-in of the



Longitudinal Section. Transverse Section.

Fig. 9. Elongated Elliptical Vaults in the Drains at Khorsabad. After Place and Thomas.

joints was done after the whole was laid, by means of crude clay. Moreover, in the triangular arched construction a voussoired key is not necessary, as the two halves need only to be buttressed against each other at the summit, that is, contact need only be established, in order that the vault should be maintained in equilibrium. There was, therefore, nothing irrational in the disposition adopted by the Ninevites.

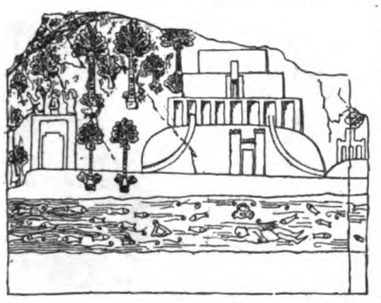


Fig. 10. Assyrian Temple, from a Bas-relief (Layard).

When the vaulting was in the form of an elongated ellipse (Figure 9), it will be remarked that the trapezoidal shape given to the moulding of the voussoirs was not well adapted to the peculiar key-joint. Without taking any farther precaution, the Assyrian builders contented themselves with merely inserting two clay wedges.

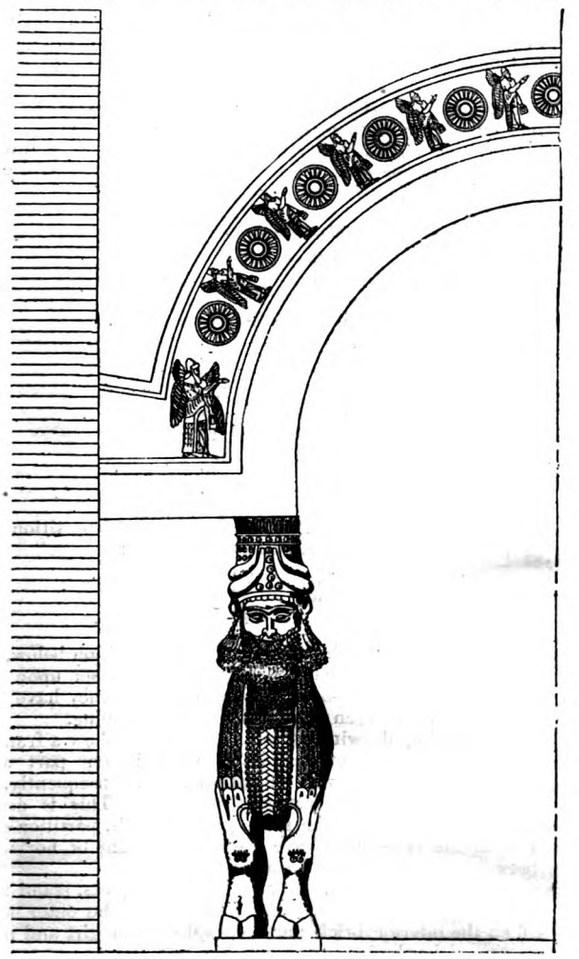


Fig. 11. Door in the Southeast Façade at Khorsabad (8th Century B. C.).

Although the several-storied tower was the orthodox design for religious edifices, variants of this disposition were not unknown. An examination of the remains discovered by Taylor and Loftus at Warka, Abou-Shahrein, and Mougheir seems to prove that in these structures the tower did not rise in accordance with the vertical axis of the basement, but was set back. Flights of steps and broad terraces were laid out in front; there was a chapel at the summit. Restorations, necessarily hypothetical on account of the insignificance of the fragments that have been preserved, have been attempted by Perrot and Chipiez; these are very likely quite correct.

We must also call attention to a disposition exhibited on a bas-relief found at Koyunjik (Figure 10), in which the basement seems to have taken the form of cross-vaults. Two paths traced along the flanks of the substructure apparently lead to the base of the terrace-tower.

And, lastly, it is believed that vestiges of temples constructed on a wholly different model have been found at Khorsabad and at Nimrud. In design, they apparently approach more nearly the universal type of a temple; there is an anterior room, a *pronaos*, perhaps, communicating with a *naos* or *cella;* a few adjoining chambers, the uses of which are unknown, extend along the side.

How were these temples decorated, if, in fact, they are temples? This cannot be determined, as the condition of the ruins allows of only a reconstruction of the plan. We may, perhaps, assume that their general form is indicated in the familiar bas-relief of Khorsabad. In that case, the façade must have consisted of a triangular pediment supported on pillars and columns. But it is not certainly known whether the edifice represented is Armenian or Assyrian, nor whether it is indeed an example of a temple. For the present, therefore, it is best to maintain a discreet reserve on all that concerns this particular form of Assyrian religious structures.

As for the system of decoration employed, the details properly belong to a special article on Assyrian architecture. We will merely call attention here to the southeastern door at Khorsabad (Figure 11), where the greater part of the motives will be found.

[To be continued.]

PROPOSED LAW FOR LICENSING ARCHITECTS.

"All the Modern Improvements." — No. 7.

THERE is given below the text of a bill introduced in the New York Legislature providing for a State Board to license architects:

SECTION 1. Within 60 days after the passage of this act, the Western New York State Association of Architects and the New York Chapter of the American Institute of Architects, may each, at a duly called meeting thereof, nominate four of its members for appointment as members of the State Board of Architects, and may transmit such nominations, duly certified by its President and Secretary, to the Governor of this State. The Governor shall thereupon appoint seven persons to constitute the State Board of Architects, as follows: Two shall be appointed from the members so nominated by the Western New York State Association of Architects, one of whom shall be designated to hold office for one year; two shall be appointed from the persons so nominated by the New York Chapter of the American Institute of Architects, one of whom shall be designated to hold office for one year; one shall be so appointed from the persons constituting the Faculty of Architecture of Columbia

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College; and one shall be so appointed from the persons constituting the Faculty of Architecture of the Cornell University; one of the persons so appointed from one of the said faculties shall be designated to hold office for one year; one of the persons so appointed shall be a lawyer of at least five years' standing. Each person so appointed shall hold office for two years, unless so designated to hold office for one year. Annually thereafter the Western New York State Association of Architects and the New York Chapter of the American Institute of Architects shall each nominate for appointment by the Governor in like manner two of its members, from whom, in each case, the Governor shall appoint one member of the State Board of Architects for the term of two years. Upon the expiration of the term of office of the member appointed from either of said Faculties of Architecture, the Governor shall appoint from said Faculty one person as successor to such outgoing member, to hold office for two years. Upon the expiration of the term of office of the person appointed from the legal profession as a member of said Board, the Governor shall appoint a person qualified in like manner as his successor for a term of two years. Each member shall hold over after the expiration of his term until his successor shall have been duly appointed and qualified. Any vacancy occurring in the membership of the Board shall be filled for the balance of the unexpired in like manner. The members of the Board shall serve without compensation or reimbursement for their services and expenses from the State.

Sec. 2. The members of the State Board of Architects shall, before entering upon the discharge of their duties, take and file with the Secretary of the State the constitutional oath of office. They shall annually elect from their number a President and a Secretary, who shall also be Treasurer, to hold office for one year. The Board may adopt rules and regulations to govern their proceedings, not inconsistent with this act. The Board may adopt a seal, and the Secretary shall have the care and custody thereof, and shall keep a record of all the proceedings of the Board, which shall be open to public examination. Five members of the Board shall constitute a quorum; but the Board may delegate the examination of applicants to a committee of less number to report the examination to the Board. Special meetings of the Board shall be called by the Secretary upon the request of any two members, by giving at least five days' written notice of the meeting to each member. The Board may adopt rules and regulations for the examination and licensing of applicants for licenses to practice architecture in accordance with the provisions of this act, and may amend, modify and repeal such rules and regulations from time to time. The Board shall, immediately upon the election of each officer thereof, and upon the adoption, repeal or modification of the rules and regulations for the licensing of applicants, file with the Secretary of the State, and publish in at least two architectural journals, the name and post-office address of each officer and a copy of such rules and regulations, or the amendment, repeal or modification thereof.

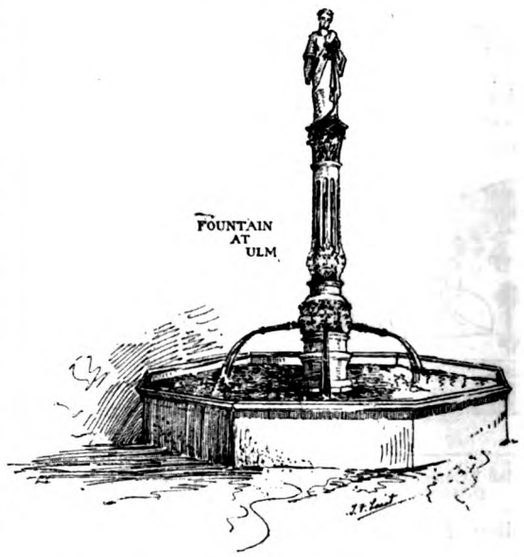
Sec. 3. Provision shall be made by the State Board of Architects for holding examinations of applicants for license to practice architecture at least once in each year, if there shall be any application therefor, in each of the judicial departments of the State, except the second judicial department, and any person over 21 years of age, upon the payment of a fee of $5 to the Board, shall be entitled to enter any examination appointed for determining the qualifications of applicants for such license. If the examination of any applicant for a license shall be satisfactory to a majority of the Board, a license shall be issued to the applicant, authorizing him to practice the profession of architecture, upon the payment of an additional fee of $15. A person who shall at the time of the passage of this act be engaged in the practice of architecture in this State shall be entitled to such a license without fee or examination on presenting to the State Board of Architects an affidavit to that effect. Each person so licensed shall cause the same to be recorded in the clerk's office of the county of his residence, or, if a non-resident of the State, in the county in this State in which he shall have an office, and the clerk shall record the same upon payment to him of his fees at the same rate as for recording a deed. Upon every change of such residence or office from such county to another county in this State, the holder of such a license shall cause the same to be recorded in like manner in the clerk's office of the county to which such residence or office shall be changed. The Board shall keep on file in the office of the Secretary of State a correct list of all licensed architects.

Sec. 4. Any license so granted may be revoked by the State Board of Architects for gross negligence, recklessness or dishonest practices of the holder thereof; but before any license shall be revoked, such holder shall be entitled to at least 20 days' notice of the charge against him, and of the time and place within the county of his residence of the meeting of the Board for hearing and determining of such charge. For such purpose the Board shall have the powers of a court of record sitting in the county in which their meeting shall be held, and issue subpœnas and to compel the attendance and testimony of witnesses. Witnesses shall be entitled to the same fees as witnesses in a court of record to be paid in like manner. The accused shall be entitled to the subpœna of the Board for his witnesses and a reasonable opportunity to produce his witnesses before them and to be heard in person or by counsel in open public trial; and no license shall be revoked except by the unanimous vote of all the members of the Board.

Sec. 5. If a person shall pursue the practice of architecture in this State, or shall engage in this State in the business of preparing plans, specifications and preliminary data for the erection or alteration of buildings, or shall advertise or put out any sign or card designating himself as an architect having an office or doing business within this State, without a license therefor in accordance with the provisions of this act, he shall be guilty of a misdemeanor, and upon conviction, shall be fined not less than $50, nor more than $5,000. But nothing herein contained shall be constructed to prohibit any person in this State from acting as architect of his own building, or as architect for any person employing him with full knowledge on the part of such employer that the person so employed is not a licensed architect in accordance with this act; nor to prohibit architects residing in other States and not having an office or carrying on a general business in this State, from competing for a special building, or from visiting the State for such purpose in person; nor to prohibit students or employés of licensed architects from acting for or upon the authority of such licensed architects.

Sec. 6. The license fees received by the Board may be expended for the payment of the travelling and other expenses of the members of the Board. An itemized account of such receipts and expenditures shall be kept by the Secretary of the Board and a report thereof for each year ending with the 13th day of September, duly verified by the affidavit of the Secretary of the Board shall be filed with the Secretary of State within 60 days thereafter. Any surplus of such fees exceeding $500 shall be paid annually by the Board to the Treasurer of the State.

SUGGESTIONS FOR THE IMPROVEMENT OF HOUSE-FRAMING.



In our wooden frame houses, cracks in the plaster of the walls are very common. The principal cause of these cracks is the unequal settlement of the walls and partitions, which is due to the shrinkage of the frame.

In the ordinary method of framing, the second-story studs of the outer walls have between them and the unyielding underpinning (?), fourteen inches of shrinkable timber, whereas the studs of interior partitions have 29⅝″ or 4″, according to the mode of construction adopted. This timber is disposed as follows:

OUTER WALLS.

Girt,	8″
Sill,	6″
Total,	14″

INTERIOR PARTITIONS.—COMMON MODE.

Sole,	2″
Floor-boards,	⅛″
" joist,	10″
Partition cap,	2″
" sole,	2″
Floor-boards,	⅛″
" joist	10″
Sole (?)	2″
	29 6-8″

Or, if the better way of setting studs directly on the partition-caps is adopted, the shrinkable timber will be as follows:

Cap,	2″
Sole,	2″
	4″

The studs of partitions with no corresponding partition below, and the furring studs around chimneys, are customarily set upon a 2″ sole, which rests on the floor-boards. Consequently, they have 29⅝″ of shrinkable timber between them and the underpinning.

The accompanying drawings (See Illustrations) show a frame in which (provided the timber shrinks as much in one part as in another (?)) the settlement will be uniform, and, consequently, the principal cause of cracked plastering removed. This is accomplished by arranging that all the studs (furring-studs, partition-studs and all) upon the same floor have the same amount of horizontal timber between them and the unyielding foundation.

The studs of the first story, and also the corner-posts, stand upon a sill of the same thickness throughout: 6 x 8 on the outer walls, and 6 x 6 on the interior brick partition-walls. The girt and partition caps are of hard pine, which shrinks less than spruce. The partition-caps are of the ordinary size, 2 x 4, while the girt is 3 x 4, and the studs are framed into it half-an-inch on each side, so that there is left but two inches of timber between their ends.

Over door and window openings the girt and partition caps mus t

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be reinforced with angle-iron, or else the openings must be trussed in the ordinary way. (See isometric drawing.)

The furring-studs about chimneys rest upon a 6 x 4 sill at the first floor, and have a 2 x 4 cap, the same as the partitions. The sill supporting them rests upon an engaged pier built out from the corner of the chimney-breast. (See drawing.)

All partitions which have no corresponding partition below to rest upon are trussed so as to be self-supporting; or, if the openings will not allow of this, they may be supported on iron or steel I-beams; or, if there is nothing but their own weight to be supported, they may rest upon an iron strap screwed into the under-side of the floor-joists.

The cost of a five-inch I-beam, 16′ long, weighing 30 pounds per yard, which would be amply strong enough to support a partition over a 16-foot span, would be, with iron at present prices (3 cents a pound), only $4.80.

The drawings also show a departure from common practice in the method of framing the studs into the sill and girt. The studs are ordinarily cut with tenons on both ends, and the bearing comes on the shoulders alone. Thus the full strength of the timber is not utilized. The drawing shows the studs cut with flat ends, so that they bear over the whole surface. They are notched into the sill half-an-inch or so, and secured by nailing to the floor-joists.

The writer claims no originality for the methods above described. He has, however, never seen a text-book on construction which described any of them. WILLIAM ATKINSON.

MAYENCE CATHEDRAL. — THE GLYPTOTHEK AT MUNICH.

WE are now at Munich, but if the reader will permit we will retrace our steps and briefly consider one of the grandest specimens of German architecture, the cathedral at Mayence.

The effect of the Mayence Cathedral is much marred by its unfortunate location; surrounded as it is on three sides by houses, stalls and sheds, and planted in the midst of the busy throng on the market-place, it is only with some difficulty that the main entrance, which as usual in double apsidal churches is placed in the middle of one of the sides, can be found. It is naturally quite unimposing, a characteristic of the Romanesque style in Germany if not elsewhere. A marked contrast lies between the simple grandeur of the German Romanesque and their Gothic, a style which the Germans never seem to have fully understood, importation as it was. For it is now a pretty well established fact that in Germany the Gothic style was not a development of the Romanesque as exhibited in the three great cathedrals, Mayence, Worms, and Speyer, but was brought from France. The cathedral at Mayence is, in point of size, the most noteworthy of the three, also in point of beauty, I should say. Its history is most varied and interesting. From the outset it seems to have been the unfortunate prey of the flames, for from the ravages of fire it has ever suffered much.

Thus we learn that in the year 978 the corner-stone was laid by Archbishop Willigis. Thirty years later, on the eve of the day of its dedication, the ceremonies of which were carried on with all the pomp and splendor of the time, it was destroyed by fire. It is known that at this time the structure was a basilica with the usual flat ceiling of wood. In the year 1024 it must again have been completed, for it was at that time and here that the Emperor Konrad II was crowned. But in 1081 it was almost completely destroyed — from this period nothing remains but the two corner towers on the north and south side of the east choir — and also, in 1137 when, with a whole district of the city, it was at the mercy of the ravaging element. It was only two years before that the chapel St. Godard was commenced, which fortunately remained unimpaired.

In 1159 the cathedral was used as a place of refuge by the clergy who were threatened by the oppressed citizens, enraged by the continued demands for money. Resistance after a short time was of no avail and the cathedral was given up to the mob, who plundered the vaults, which contained no mean treasure, carried off and destroyed what they could and then entered the house of the bishop where they completed their destructive work. They, however, were compelled to pay dearly for thus venting their spite when the Emperor Frederick Barbarossa heard of it, for he soon made them repair the damages. In another riot a year later, the bishop was assassinated. This time the punishment was more severe. The Emperor ordered the wall and gates of the city to be levelled to the ground.

The most disastrous fire, however, was yet to come, for in the year 1190, a part of the Cathedral and three other churches in the neighborhood were entirely destroyed.

The people looked upon this calamity as a visitation of the wrath of heaven and a punishment for the murder of the bishop. Rebuilding was soon commenced but some years later the roof of the central tower was blown off during a gale. This was on the day of a great feast, the emperor, the clergy, and all the great people of the country were in the city. An immense wooden structure had been built, the cathedral not having yet been in a condition fit for the ceremonies, which was torn to pieces by the tempest. And it is reported that the immense wall timbers were sent flying over the Rhine and there deposited. Awe-stricken eye-witnesses also avow that on one of these beams his Satanic Majesty had perched himself, and that this æronaut after having circled around the city several times disappeared over the Rhine.

In 1757 the Cathedral was again partly destroyed by fire. It was rebuilt, but during the bombardment by the French in the year 1793 it met with a similar fate. After the French had gained possession of the city they decided to entirely destroy it but this act of vandalism fortunately was never accomplished. The reason they gave for their destructive intention was, to quote the words with which the prefect answered all questions regarding his intentions: "*C'est trop Gothique.*" In 1828 an iron dome was put on the central tower but which does not now remain.

Turning again to Munich I should like to treat briefly of several public buildings which to me seem quite noteworthy; in the first place, of the Glyptothek.

The Glyptothek, the Gallery of Sculpture, erected at the beginning of this century and containing the collection formed by King Louis I, not only heads the long list of buildings with which this sovereign beautified the city of Munich, but also marks the opening of the career of one of his most celebrated architects, Leo v. Klenze. Klenze, who practised entirely in the Classic style and who, in fact, thought there was no art but Greek art, held the position of architect to the King until the latter rather wearied of that style and compelled him to share the honors of the position with Fred. v. Gaertner. Gaertner practised mostly in Florentine Renaissance and we shall have occasion to look at one of his buildings presently.

King Louis, to whose exertions Munich owes its present prosperity, not only as a city but as an art centre, held his architects in high esteem. Not only do their bronze statues mark one of the public squares of the city but their busts have also found a place in the Bavarian Hall of Fame (*Ruhmeshalle*).

The location of Munich offers none of the advantages which are usually the requisites of the site of a great city. That its architecture must suffer under such existing circumstances is but evident. The materials with which to build must be brought from a distance, no quarries being found in the neighborhood and on the plateau upon which it is situated; the difficulties of transportation are also vastly increased by the fact that the river Isar, upon whose banks the city is built, is unnavigable. From these facts alone it can readily be understood that as far as monuments of the past are concerned Munich has but little to boast of, and stands far behind the venerable cities of Augsburg and Nuremburg which still bear the unequivocal marks of the wealth and taste of their old patrician families. But with the reign of King Louis commenced an era of art and architecture which even to-day makes itself felt. Himself a poet as well as an artist, a practical architect as well as a connoisseur, he did more to encourage the fine arts than probably any other European monarch ever has done, at least, one with such limited means at his command.

The Glyptothek in its exterior treatment is of a Greek character. However, no servile adherence to Greek precedence is noticeable, as the niches on the front and sides will show. The plan is essentially Roman, also the treatment of the various rooms, which are vaulted, barring the *motifs* of the decoration which have a flavor of the style of the exterior. I do not express an individual opinion when I say that the proportions of the exterior are most beautiful and pure, while the plan is most admirably adapted to its purpose and pleasing in the extreme.

To the left, one passes through the various chambers and halls in a circuit to arrive again at the starting-point, the entrance-hall, from which opens the Assyrian room, whose walls are covered with reliefs taken from the Palace of Nineveh. The entrance to this chamber is guarded by two huge, conventional Assyrian lions, much like those at the Louvre, almost startling, painted as they are in gayest and most sunny of Assyrian colors. The plan is so simple that an explanation is superfluous. Be it said, however, that each chamber is devoted to a certain nation or group. So, the first chamber is the Egyptian one, over the doors of which is placed a tablet illustrating the scene where Isis discovers the body of Osiris. The walls are of stucco-marble, as indeed are those throughout the building, in tints ranging from the lightest to the darkest, all of which are so selected as to form a good background for the sculpture. The floors are of marble, while the ceiling is decorated with plastic stucco-ornaments mostly in white and gold. Not to be forgotten are the three chambers, barren entirely of plastic work, which are given up to the frescos of Cornelius, illustrating scenes from mythology and the Iliad. On one side, it will be seen, three rooms have been thrown together to afford space for the collection of Roman sculpture. To satisfy the eye, the great length of the room demands a corresponding increase in the height of the ceiling. This is brought about by lowering the floor, necessitating the steps at each end which always look so well. The entrance, carriage-porch and reception-room in the rear are reserved for

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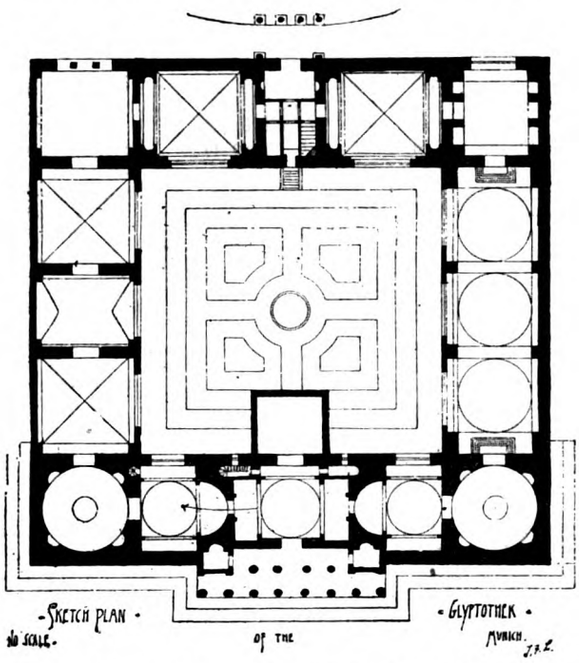
royalty and people of note. Plain bronze doors on the front separate the outer world from the treasures within. The exterior is faced with white marble. In the niches — which take the place of window-openings, light being obtained from the court — on the front are

statues of Vulcan, Phidias, Pericles, Hadrian, Prometheus and Daedalus. One side is devoted to the best sculptors of the fifteenth and sixteenth centuries, Donatello, Ghiberti, Vischer, Michael Angelo, Cellini and Giovanni da Bologna. On the other side are the more



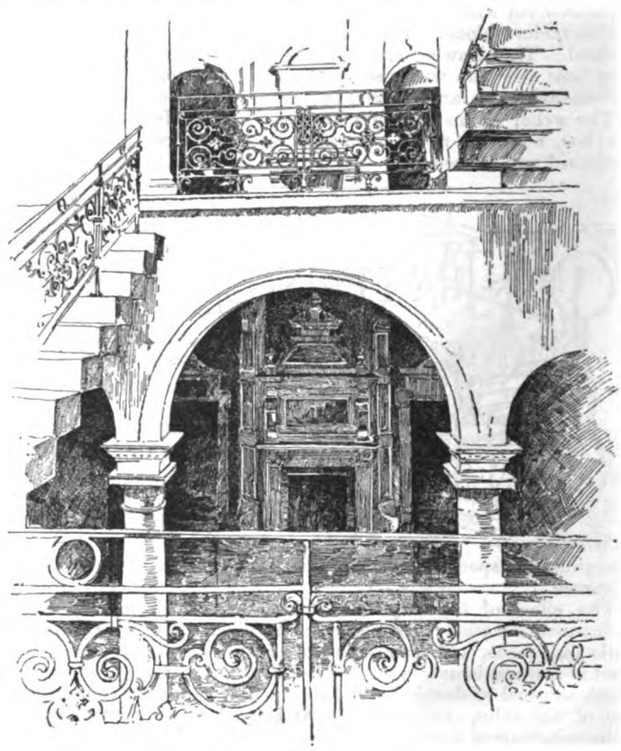
modern ones, Canova, Thorwaldsen, Rauch, Tenerani, John Gibson and L. v. Schwanthaler. The rear, I presume, will be given up to the sculptors of the present day. The tympanum also presents a group in which Minerva occupies the central position.

SILESIAN COUNTRY SEATS. — I.

A Modern Silesian Country House.

THE country seats of Silesia are among the most interesting in Germany to a person in quest of the characteristic German style of house. The province lies away from the coast and great river trade of the world and has, therefore, been less filled with foreign productions than the Rhineland and sea-board; at the same time, being rich in mines and fertile districts of land, the means of its inhabitants have been considerable enough to excuse a tendency to luxury. There is no such thing as a Silesian style of architecture; but one finds more old pieces of architecture of a middle aristocratic grade there, dating from the sixteenth to the commencement of the nineteenth century, than exists in other provinces. It is an exclusive and at the same time a rich country.

Pomerania and Brandenburg, in opposition to Silesia, present a quality of sandy soil so poor as to make an immense quantity of land necessary for the support of a manor, and, as a result, houses stand at distances of a dozen miles apart. There are fewer of them, and intercourse between the proprietors is more limited, so that the incitements to the cultivation of the arts are feeble. They offer, on the whole, the poorest architectural finds to the seeker of the typical in German building and decoration. Mecklenburg, on the other hand, possesses too *many* mansions. The rich merchants of Hamburg and Bremen cherish the ambition of becoming landed



From the First Landing.

proprietors, and buy the estates of ancient families that have become impoverished, and divide the land into smaller parcels, while filling the old seats with manufactured wares, and altering the old exteriors. What one sees in Mecklenburg is costly, but it is seldom peculiarly native, excepting of course, here as everywhere, the few feudal seats that are still held tenaciously by descendants of a conservative race.

The right mediums for the ample quietude which constitutes the fundamental idea of a country seat, are thus found in Silesia to an extent that hardly obtains in other Prussian provinces. For, while some estates are sixty miles square, the average *gût* takes commonly only from an hour to an hour and a quarter or two hours to cross, and measures from five to ten square miles in extent.

More than this measurement amounts, in my experience, to isolation now, and must have been an isolation very seldom broken, indeed, in old times when the roads were bad and infected with every sort of freebooter. Enough cases exist to show the effect on houses where such conditions prevail; the first being, they are infrequently left or visited. A generation will go by without the necessity of improvement being felt. All that is done on the manor-house or contingent buildings is done by the home mason or carpenter. Then, suddenly, a son will come back from town or his regiment, as heir to the property and with his head full of statelier-looking buildings. Very often the latter are town-palaces or even productions of a foreign people. Yet he adopts the incongruous plan of altering the old place after these models. He lives in a raw climate where winter cold lasts from October till July; yet ten to one, if he does not tear down a floor to make his saal, or drawing-room, as lofty as that in a seat in southern France or Italy. If he is, or thinks himself to be, a *grand seigneur*, he is certain to call in a master-builder or architect from one of these countries or the other; and, almost as invariably, his means give out. Building activity ceases suddenly and permanently. The visitors for the next generation find a ceiling of Italian oil paintings set in elaborate gold frames in one room, while the ceilings of all the others are whitewashed and devoid of decorations; a parquet floor, walls of mirrors and furniture of buhl-like delicacy, where the rest of the house is planked with oak timber and scantily set with cumbrous cupboards, and with sofas as high and massive as beds.

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The other extreme that comes to light in Germany, where estates are so small as to lead to unbroken social propinquity, is total modernizing of houses. Instances of this sort, too, are offered by Silesia, and are likely to increase in number.

Exactly why the Italian Renaissance is resorted to, in these latter cases where renovation is thorough, may be explained, perhaps, by the new stress lain everywhere in Germany of late years, on light staircases. The first cut shows a typical house after re-building, and the second, a view from the first landing of the stairway in it. The light in the latter illustration comes through the round-headed Venetian windows of the front (they must be called Venetian despite their upper frieze, inasmuch as they present the large central window with closely pressed smaller ones right and left), and the door must be thought of as directly beneath. The third cut shows the same view from a point on the ground-floor looking up towards the landing. I can hardly convey in words an adequate idea of the cheerful and spacious air of this hall. It is not in pure style as the first glance will show; the supporting pillars are copies of the two in the court-hall of the Palazzo Balbi at Genoa, with the pedestals simplified, and the position of the entrance-door half-way down to the basement level, reminds one instantly of the first application of the idea by

From the Floor.

Lurago, that was hailed as so ingenious by his contemporaries of the sixteenth century. But the general plan, as well as such details as the balustrade, vary from its Italian predecessors. Nevertheless, it suits its purpose admirably. The drawing-rooms of the house are on this floor, and the space won by omitting a duplicate flight of steps at the right hand, is used as a passage to a hat and cloak room. The floor is composed of slabs of a colored and polished surface and the rich bronze of the balustrade forms a connecting link from it to the deep rich tone of the stained windows at the first landing, and to the sumptuous "hall of weapons" into which the second and main landing opens. The pillars and the treads of the staircase are of whitish gray limestone while the walls are covered with a hard plaster of the same neutral tone. If the balustrade were of a like color, and of stone or a similar material, the effect would have been too cold for a country home. Carpets and mats would have looked like hard stripes and spots in an expanse of lightness; whereas, they fall in now with this detail — the bronze railing — and the bronze of the chimney piece and drawing-room doors.

The German social season is mainly confined to the winter months, and the guest arrives at a country house to dinners and balls after a chilling drive. He needs space for throwing off his fur cloak and for having his overshoes pulled off; for storing his fur foot-bag, and the foot-bags and mantles of his family. Often, on about departing, he must wait for his carriage or sleigh and so must his neighbors. It would seem to the company a hazardous thing if this waiting were done in a space heated warmly. Transpiration would take place instantly, wrapped as the last man among them is to the eyes in mufflers and furs. A tempered atmosphere in consequence is all that one finds tolerated, and a vestibule, in accordance, is furnished with only slight means for heating. It cannot be made an essential part of the living-room of the house, nor do I know of a single case among old seats where an attempt has been made to make it so. This trait of a comfortable hall must be left to the architectural and decorative peculiarities of English houses. Germany does not offer it (save, of course, in imitations of English houses). And the reason why stress here should not be laid upon the uses of the hall in summer, in place of its use in winter, besides the fact of the longer duration of the cold season, includes also the very influential fact of national habits. For the German sits entirely out of doors when he seeks fresh air at all. If the air is agreeable, it is dry. He knows nothing from experience in his climate, of a shower falling through an atmosphere so soft and delicious that dampness adds the culminating degree to the suave sense of the enjoyer of it. Nor does he know of fresh draughts, like those through a Kentish or Kentucky hall, at once invigorating and harmless. The rain that falls from the low sky over the great plain of North Germany, falls through an atmosphere, mostly, which has been long soaking in moisture, and every door is shut, and must be shut, against it. What, however, is a hall in this dark climate with shut doors? No place to abide in.

The given example becomes as near perfection as a hallway, for all these reasons, as I can recall. The chimney is comparatively small, and the architectural details of its shelf and cornice are kept in proportion with the frames and cappings of the doors at the left and right, being in accordance with its central position between these door-frames, somewhat higher than the last. As the house is modernized it is actually heated with steam, but the æsthetic feeling, together with tradition, demands a *visible* embodiment for heating; a grating in a side wall is too unsatisfactory for it — at least, it is as yet; and this fireplace conveys the right sense to the native German. A fire in it would take off the biting chill of dampness in the airy hall and leave the temperature not too warm, nor cause a stream of draughty heat to sweep up the open space of the wide and lofty stairs.

Then, while I am in this house, I must call attention to the upper-floor, for its arrangement is another characteristic innovation upon the old seats whose type I shall mostly describe. It follows the plan of the ground-floor, and the vestibule has the same form and measurements as the lower one. But whereas the rooms below are necessarily spacious, being meant for large companies and social occasions, space can be taken above for corridors. Bedrooms and dressing-rooms need separate entries, and need not be large, since they are inhabited by single persons.

In this example the chambers are unnecessarily deep and the corridors narrow; but in other cases of which this seat is a type in the main, but not in this particular, the corridors that run right and left from the vestibule are well lighted by large end windows, and of ample width.

I have mentioned that the arched portals of the upper vestibule, seen in the second cut, lead into a "hall of weapons." Billiard-tables stand in it, and, in the event of balls, it is used as a smoking-room.

The house has hardly any constructive features besides this plan of the vestibules and stairway, which differ from those of the typical old manor. The one great difference between it and the common manor-house relates to decoration, and is found in the fact of it being filled everywhere with furniture.

Your manor of old date is three-fourths empty. It was built at great cost by masons and carpenters brought from a distant town. Its walls are constructed in the traditional manner, very thick, from two to three feet or more, of stones split from neighboring rocks or gathered from the fields (the alluvial of North Germany is full to-day of glacial boulders), embedded in mortar and ornamented, outside and in, with a facing of plaster. It was a long time before these walls were raised. Add to this time, the space taken to complete the interior divisions and their frames and doors, and the date is got at when the purse of the builder gave out. In several of the archives, too, which I have looked over, the kindling of feuds or the continuation of old ones seem to have been direct causes for the cessation of building. And the instances are few, as it is evident, where any second or third undertaking at building ever reached the compass of the first great attempt. Most of the existing manors date from after the Thirty Years' War, and the country was comparatively poor and kept on, as all nations did after the decay of the Renaissance, without feeling any especial ambition for architectural refinements and beauty.

The strange masons and carpenters being gone, no one was left but the village artisan, who worked for his lordship, and finished every year a table or a cupboard or two. One can fancy the process, for the thing goes on still upon many an old domain. Often the proprietor or châtelaine gave the man a sketch or "an idea" of the piece to be made, but the rule was in old days for the latter to collect a store of models in his mind by a wandering apprenticeship abroad, and, on coming home, to give his lordship insights into the marvels of his art. I have in mind a cupboard in the *saal* of a castle which my husband inherited, that was large enough for storing the bedding of sixty-eight guest-chambers, and was eleven years in the workshop of the local carpenter and cabinet-maker. Cabinet-maker and carpenter are one and the same in these villages, and, as they do all repairing for the manor and in the village, a piece of furniture is long in hand. The quantity that can be delivered in a generation is small; but smaller still is the quantity that has been set up. Or, have I left the gifts too much out of account, that must have gone during the centuries to brides and related heirs?

And, then, besides these old conditions which drag on still alongside of the new facilities, offered by roads and railroads, for bringing manufactured furniture to isolated seats, a very considerable stress must be laid again upon native habits, for explaining the half-furnished state of Silesian homes. And, among the first of these, the reliance of country families on the military for guests must be brought up. England hardly offers the like, for the garrisons in the island are fewer and denser. In Silesia their multitude has produced a new phenomenon in country society and houses. For, whereas the squire and his family had no pressing business or engagements to call them back when once arrived at a neighbor's, the

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officer has; and where, in consequence, chambers were kept ready for the first, no such need occurs in the case of the latter. He must be at his post in the morning, even if he rides half the night to reach it. A ball-room in which half of the men and three-quarters of the dancing-men are military, and the rest the landed proprietors of the *kreis* or circuit, is a common sight. And these fill the house, without any necessity having been felt by the host, to invite "all the country." Hardly a family is present which will not be in its carriage on the long, black, winding road, at the close of the ball; whereas, in the old times when the manor was built, there used to be after such a festival, hardly one which was not ensconced in warm, white beds under the roof where they had danced.

The great unions of kin occur only at weddings or funerals, and it is hardly worth while to keep the great guest-chambers in order, or scarcely to furnish them, for such rare events as these. They, therefore, stand denuded of all furniture but their monumental beds and wardrobes, and the cases are extremely rare where even a few of them have received such ornamental architectural details as corniced ceilings and the like. More often the old stucco work that existed has been blurred and its delicacy spoiled by defacing modern washes of lime.

Thus, from the start, one must release a quarter of the whole of an old seat from all investigation. It is mere empty space. What is left to repay one's interest, are the façades of the manor, the living-rooms of it and the typical bed-chamber.

I can make no mistake, I think, in giving Kreisau, the seat of the renowned Count Moltke, as an example of a regular Silesian *Schloss*. It is old, and retains the original features of the earliest German architecture, together with the additional decorative alterations which had their vogue in the seventeenth century and the beginning of this. If you search Silesia, you will find manors without these latter alterations, or with one of them without the other; but, unless the seat is wholly modernized or a princely castle, no type will come to light which Kreisau does not essentially contain. It is *par excellence* the Silesian country-home of the middle aristocracy.

Schloss Kreisau.

By chance I discovered in a little town two buildings near together which are monuments of the two epochs in architecture out of which Kreisau grew, and I had them photographed. That at the right, now sunk three German feet into the soil, and used as an inn at present, dates from the fifteenth century, and was the seat of one of the courtiers of Duchess Hedwig, called the Saintly. The dilapidated castle of the Duchess, at no great distance, built in the same century, lies surrounded by a boggy garden that was once a moat. Its style is the same as that of the inferior seat here given: a quadrangular frame, two stories in height, with massive thickness of walls, surmounted by a steep roof slanting from the four sides towards a common *ramp* intersected with eyelid windows, and covered with potters' tiles of a brick-red color.

Two Old Silesian Mansions.

The house at the left was built in the beginning of this century for a Prince of Würtemburg by a native master-mason. The Prince was detailed to the command of a garrison stationed in the town, and was but just married; later, the house became the birthplace of the present King of Würtemburg, and served for the reception of relatives and for various ceremonies of presentation. It will hardly be believed that the bedrooms of the upper floor inside the roof are built out of the garret-room, and that the raw rafters are still to-day picturesque memorials of those early times! But strange things appear as one leaves the palaces of state of German princes, which were erected by architects who had studied at Versailles, and seek their native humbler nests.

The interior, for the rest, is still imposing. An immense dancing-room occupies a fourth of the whole of the ground-floor, and the ceilings and walls, although repeatedly whitewashed, reveal stucco-work of such elaborateness and fineness that I first got the idea here, which since then has often raised a question as to whether the technics of this art, like that of some others, did not live on in the provinces long after being out of date and knowledge in the larger towns.

But my aim was to call attention to the façade of the Würtemburg house, and particularly to the breaking-through the roof by the crowning front above the middle door, for this feature is the last of the old innovations. Between it and the earliest type of façade — which was properly no façade at all, inasmuch as all the four walls of a building presented one and the same aspect — come, first, the doubling of the roof, and, secondly, the broadening of the "eyelids" into dormers, or windows with a gable of separate structure, and the enclosing of windows and doors with frames. The earliest roof for narrow buildings was a so-called saddle-roof, or a two-sided, steep incline towards a common ridge, and German works on architecture term it often "the German style" of roof. But existing buildings of the dignity of manor-houses almost invariably display a four-fold incline, the two-sided roof with a gable at each of its narrow ends being restricted to inferior buildings and city houses. The idea of making the roof two-storied came into Germany from France. A few specimens offer such arbitrary variations as a convex upper roof and a concave lower portion; or an inclined lower frame with a concave upper slant. But, out of a hundred seats, ninety show, as a rule, the simple construction in their roofs of Schloss Kreisau.

Houses with two-storied roofs and framed doors and windows are said to be, by the Silesians, in the *zopf* or "wig" style of architecture. The oldest specimens of native buildings have frameless windows. I have seen rich seats even without so much as a wash of lime-water about the windows to relieve them from the yellowish-gray of the old walls. In Kreisau the frames are architectural reliefs, but in many cases the reliefs are flat, being carried out in stucco, or are no reliefs at all, but *intaglios*, or mere scrolls scraped into the wet plaster of the walls.

The designs of the frames of the front doors, as well as that of these window decorations, are almost invariably conceived in the spirit of the baroque or rococo styles. Kreisau is not a pure example in this respect. A modern renovating hand has been laid on the cornices of the windows, and, in contradiction to the genuine old rococo of the front door, has stretched a line of decorative relief, or a frieze across the façade, so as to mark the division between the second and third stories. The lower portion of the house, which is old and typical, has no such line, but offers its windows to the sight as detached inlets to the air and light.

The architectural development of two fronts is another feature of Silesian manors, and a thing that marks an old seat from new mansions is the fact of the finer façade being turned to the park in old manors, whereas the new turns its best side to the public, or, should I say, to the entrance, seeing that in the country the public is hardly worth speaking of, being composed of only the villagers and the rare passengers that drive along the nearest highway. In the new, too, the court is often laid out at one side. Old seats, however, have all their barns and cottages directly before the manor, and you pass under an arched doorway or between two buildings to get into the court, this latter being a wide space, bordered on three sides by the low stables and *gesinde häüser* of the manor, and on the fourth by the lofty front of the manor-house itself.

There are seats with lodges and lodge-gates, but these form the exception. Most of them still retain a traditional and patriarchal preference for parading a proud line of stables filled with fat cattle of solid worth, rather than a barren expanse of lawn with a more artistic value. Indeed, I could recount a dozen score of manors where you still drive past a manure-close and a dark pond on your way to the front door.

Countess v. Krockow.

[To be continued.]

FACTORY FLOORS.

Restored by Harry Hems.

Of the devices that have contributed to the great success of the modern slow-burning "factory" system of building, it is evident that the solid floors and roofs form the central feature and main reliance. These floors, supported by large planed timbers at wide intervals, spanned by solid planking, the whole without concealed spaces, furnish the best known means of resisting the upward progress of flame, if we except a well-protected iron framework with spaces filled with masonry.

To architects who have tried the capabilities of this feature in other than factory or warehouse buildings, its comparative cheapness and ready adaptability to many other buildings are agreeably surprising.

Having occasion to use the "factory" floor and roof in some audience rooms, and finding nothing in the books to throw light on the

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question of deflection of planking, tongued and grooved together, and of more than one span, some experiments became desirable to give the data from which to work intelligently and economically, when plastering is to be used against the planking.

In our market it is not easy to obtain lumber of greater thickness than 2″, suitable for this planking, without sending a special order to the saw-mills. This thickness is sufficient in the cases mentioned to meet all considerations of fire resistance.

In the case of both floors and roofs, these planks are to support laths and plastering — the former to be nailed to thin furring strips ($\frac{3}{8}$″ or less), the laths being placed so open that the plaster will "clinch" everywhere against the planking.

Audience rooms contain little that is combustible, if we compare with the stocks of goods in factories and warehouses; and several considerations argue for somewhat smaller timbers in the former class of buildings, placed at smaller intervals, the use of which permits spanning with 2″ plank, planed and matched.

In the following experiments to show the deflection of floors, the joists were placed with clear spans of 5′ 8″, and a platform was built on them of 2″ x 6″ pieces, surfaced to $1\frac{3}{4}$″ thick and tongued and grooved together. The platform was 4′ 0″ wide and covered three spans. Measurements were taken on the central span only — one at the middle (M) and one at the edge (E) but both at the centre of the span. The work was done by Mr. W. H. Burtis under my direction and I have entire confidence in the accuracy of the measurements to the hundredth part of an inch, except in the case of one marked with an (?) in which case there must have been some mistake. The platform was built on a very strong warehouse floor and was so placed as to affect the floor as little as possible, but if any correction is to be made it is on the safe side. All tests were made with evenly distributed loads. The spans were afterward lengthened, as will appear by the table, to give data for roofs little subject to moving loads.

FIRST ARRANGEMENT.

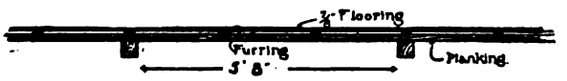
The central of the three spans was loaded with 100 pounds per square foot showing a deflection in inches at M of 0.27, at E of 0.27.

The central span remaining loaded the two side spans were loaded with 100 pounds per square foot, after which the deflection at M was 0.13″, at E the same. The load was then allowed to remain on the three spans for 70 hours, and before removing the deflection at M was 0.15″, at E, 0.16″.

After removing the load the permanent set of the platform was 0.03″ at M, 0.05″ at E.

SECOND ARRANGEMENT.

The spans and platform remaining as before, the furring strips of $\frac{7}{8}$″ stuff were nailed across it at about 2′ 0″ centres, and on these a floor of $\frac{7}{8}$″ planed and matched boards was nailed in the usual manner covering the platform thus. See sketch.



SKETCH TO SCALE ILLUSTRATING 2d ARRANGEMENT.

This arrangement was made to give a somewhat nearer approach to conditions of practice. All lumber used was dry white pine and the planking had "joints broken" as in practice.

The whole of this platform being loaded with 100 pounds per square foot, the deflection at M was 0.10″, at E 0.12″. A doubt arising as to whether the laying of the upper platform had affected the permanent set of the lower platform, the load was, after 40 hours, removed, the platform measured and reloaded with 100 pounds per foot over the three spans, giving a deflection, at M of 0.09″, at E of 0.09″.

The load was then removed from all but the central span which then showed a deflection of 0.21″ at M, and of 0.21″ at E.

No permanent set could be traced after unloading. A load of 60 pounds per square foot being then placed on the central span only, the deflection at M was 0.11″, at E 0.14″.

The load of 60 pounds per square foot being then placed on the two side spans the deflection at M was 0.04″, at E was 0.09 (?).

The loads on side spans were then removed and that of central span increased to 100 pounds per square foot, which caused a deflection at M of 0.21″, at E of 0.24″.

The two side spans were then loaded with 100 pounds per square foot, leaving at M a deflection of 0.06″, at E of 0.07″.

THIRD ARRANGEMENT.

The platform was now taken down and rebuilt 3′ 6″ wide with three spans of $1\frac{3}{4}$″ plank each 8′ 8″ in the clear. No flooring or furring above.

The central span only being loaded with 50 pounds per square foot, the deflection was 0.69″ at M, at E, 0.65″.

The three spans being loaded with 50 pounds per square foot, the deflection at M was 0.3″, at E was 0.29″.

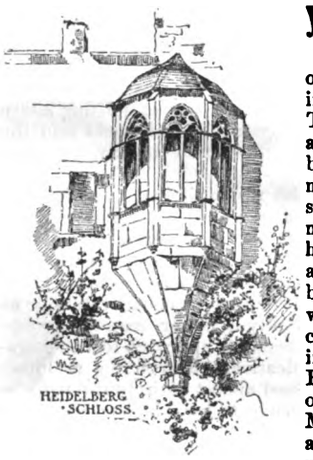
This load was allowed to remain one week when the deflection at M was 0.34″, at E 0.33″.

The results will appear in the following table.

Other conditions of tests (All loads were evenly distributed).	Load in lbs. sq. ft.	Clear span.	Number spans loaded.	Hours after loading.	Deflection in inches.	Point measured.	Permanent set in inches.
Centre span loaded	100	5′ 8″	1	0	0.27 0.27	M E	
Side spans also	100	5′ 8″	3	0	0.13 0.13	M E	
Loads remain	100	5′ 8″	3	70	0.15 0.16	M E	
Loads removed		5′ 8″				M E	0.03 0.05
Platform furred and floored	100	5′ 8″	3	0	0.10 0.12	M E	
Unloaded and reloaded to correct	100	5′ 8″	3	0	0.09 0.09	M E	
Two side spans unloaded	100	5′ 8″	1	0	0.21 0.21	M E	
Further permanent set			0			M E	0.00 0.00
Central span loaded	60	5′ 8″	1	0	0.11 0.14	M E	
Loads added to sides	60	5′ 8″	3	0	0.04 0.09 (?)	M E	
Side spans unloaded Central spans increased	100	5′ 8″	1	0	0.21 0.24	M E	
Three spans loaded	100	5′ 8″	3	0	0.06 0.07	M E	
Platform relaid, no furring or flooring, spans increased	50	8′ 8″	1	0	0.69 0.65	M E	
Loads added to side spans	50	8′ 8″	3	0	0.30 0.29	M E	
Loads remain	50	8′ 8″	3	168	0.34 0.33	M E	

F. G. CORSER.

DESIGNING AND CONSTRUCTING MILLS.



THE report of the Commissioners appointed by the Government to inquire as to the cause of the collapse of a large building in course of construction for Messrs. Templeton, Glasgow, by which about twenty lives were lost, has been laid on the table of Parliament. It contains some valuable suggestions to architects and engineers, and also to the authorities having supervision over the designs and methods of construction of buildings. The Commissioners were Colonel E. L. Malcolm, C. B., commanding the Royal Engineers in Scotland, and Mr. W. W. Robertson, surveyor in Scotland of her Majesty's offices of work. Many theories were propounded to account for the disaster, and it is remarkable that the cause, according to the Commissioners, was only hinted at by one witness before the public inquiry held on December 21 and 22. Their explanation of the accident is as follows: The first gust of wind caused the whole building to oscillate, an action which is inevitable in a structure of considerable height, and which should not damage a properly designed construction; but this oscillation severely strained the back wall, especially towards the centre of its length, and the oblique pressure which accompanied it fractured one or more of the base-plates of the stanchions supporting the wall. The second gust, acting with increased force on the somewhat weakened structure, caused a greater sway of the building, broke more of the base-plates and probably tilted some of the stanchions, causing a grinding of the wheels observed in the weaving shed. The third and strongest gust was probably that which caused the catastrophe. Under its impulse the already weakened wall, deprived of a portion of its effective support by the fracture of the base-plates, swayed beyond the narrow limits of its stability, and in its fall not only deprived the front wall of the support of the joists, but actually, by their connections assisted to drag it over. The result was the simultaneous collapse of both front and back walls.

The back wall was not exposed directly to the full force of the wind; but it was subjected to a large, though unascertainable, wind pressure, due to window-openings in the front wall and the absence of the roof, as well as to a considerable thrust transmitted from the front wall by the four tiers of joist which crossed the building. Against these forces the back wall had nothing to oppose but its own lateral stability. In matters of thickness and ratio of openings to solids it was inferior to the front wall. The Commissioners, however, were satisfied with the substantial manner of the workmanship and material. At the level of the first-floor windows (the lowest

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part which gave way) the horizontal area of the piers in a given length of the front wall exceeded that in the same length of the back wall by 40 per cent, while their aggregate width exceeded that in the same length of the back wall by 20 per cent. The front wall exceeded the dimensions required by the Metropolitan Building Act. The back wall fell, though but slightly, below the requirements of that Act. Leaving out of account the portions which were incorporated and strengthened by the staircase and other buildings at either end, the back wall was 150 feet long, and was entirely supported on iron lintels and stanchions already referred to. There being no cross-walls this back wall was but a sheet of brickwork 150 feet long and 66 feet high, perforated by a relatively large number of windows, resting on iron beams and stanchions and having no connection, except at the two ends, with any other structure which could stiffen or support it. The statement of these facts is sufficient to show that it could oppose but a feeble resistance to lateral pressure. But the stanchions on which the wall rested were not altogether satisfactory; although well enough designed to support the vertical load, the fracture of the bases of five of them has shown conclusively in what respect they were deficient. Even while the pressure came upon them as a vertical and dead load, the centre of pressure, owing to the gradual thinning of the wall upwards, was considerably nearer the last or outer side than the other. They were, no doubt, amply sufficient to bear their load as long as it was stationary; but as soon as an oblique pressure came upon them in consequence of even a slight oscillation of the wall above, they were insufficient. The base-plate projecting 6 inches beyond the solid part of the stanchion without stiffening, or gusset pieces, gave way in one-third of them at the time of the accident, and the Commissioners believe contributed materially to the failure.

The back wall and stanchions on which it rested were, in their opinion, the weakest part of the whole building. The Commissioners did not think the evidence supported the theory that the pressure was greater than a maximum of 17 pounds to the inch, as reported by Professor Grant of the Glasgow Observatory. They did not entertain the theory that the upper part of the front wall falling and carrying away the joists was the cause of the whole building collapsing, because the wall was shown to be sufficiently strong, and the idea was not consistent with the instantaneous collapse of the front wall in one mass.

The matter of supporting the joists at the walls was adverted on, but the Commissioners considered that it left the wall stronger than if they had been carried into the wall, as suggested, care of course being taken to preserve the "tie" between the front and back walls, which received careful attention in this case. Reference was made to a steam crane placed on the top tier of joisting above one of the iron columns, but nothing was said which could lead the Commissioners to the conclusion that this crane in any way contributed to the accident.

While not seeking "to apportion the responsibility," the Commissioners think "that a practical lesson of great importance is indicated, namely, that when an architect and engineer are employed in designing a building — which may in many cases be desirable — they should not follow one another and act without concert as in this case, but they should act together, either as collaborators or as principal and assistant, the responsibility in either case being perfectly clear. There seems to have been no approach to collaboration such as suggested, and communications between the architect and engineer were not direct, but passed almost entirely through the Messrs. Templeton." Indeed there seems to have been a misapprehension in the matter, and it is difficult to see how either can be held responsible. Regarding the Dean of Guild Court, which is intended to protect the public interest in respect of the erection and alteration of buildings, the Commissioners state that its control should be more real and its supervision more effective than at present. More detailed plans should be examined before the court grants authority to erect buildings — the plans did not show the details of the iron stanchions. Some well-considered code of building regulations should be framed, and with these all plans should comply. More complete inspection is also necessary. If these suggestions are given effect to, the public inquiry will have been beneficial. — *Engineering.*

Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSES ON SUPERIOR ST., CLEVELAND, OHIO. N. P. CHARLOUTTE, ARCHITECT.

[Gelatine Print issued only with the International and Imperial Editions.]

This block of houses was designed by the late N. P. Charloutte, who died before its completion and the work was carried out by Mr. E. P. Ruprecht. The approximate cost was $40,000.

DRILL-HALL, UNIVERSITY OF MINNESOTA, MINNEAPOLIS, MINN. MR. L. S. BUFFINGTON, ARCHITECT, MINNEAPOLIS, MINN.

HOUSE OF DR. E. F. HANKS, RIDGEWOOD, N. J. MR. CHARLES EDWARDS, ARCHITECT, PATERSON, N. J.

HIGH-SCHOOL BUILDING AT WINCHESTER, IND. MESSRS. WING & MAHURIN, ARCHITECTS, FORT WAYNE, IND.

HOUSE OF JOHN F. CONANT, ESQ., SEATTLE, WASH. MR. W. P. SKILLINGS, ARCHITECT, SEATTLE, WASH.

DESIGN FOR AN ENTRANCE TO A WORLD'S FAIR. BY MR. MAXWELL H. GRYLLS.

HOUSE-FRAMING.

See article elsewhere in this issue.

[**Additional Illustrations in the International Edition.**]

STRANGERS' GALLERY IN THE CHAMBER OF COMMERCE, CINCINNATI, OHIO. MESSRS. H. H. RICHARDSON AND SHEPLEY, RUTAN & COOLIDGE, *Successors*, ARCHITECTS, BOSTON, MASS.

[Photogravure.]

PLANS AND SECTIONS OF THE CHAPEL OF THE CHATEAU OF CHANTILLY, CHANTILLY, FRANCE. RESTORATION BY M. H. DAUMET, ARCHITECT.

[Copper-plate Engravings.]

HOUSE OF HERR RUDOLF MOSSE, LEIPZIGER-PLATZ, BERLIN, GERMANY. HERR JULIUS BENDLA, ARCHITECT.

[Gelatine Print.]

LEPROSERIE DE ST. LAZARE. BY D. J. BLOW.

MAREUIL. BY D. J. BLOW.

ST. SAVIOUR'S CHURCH, WESTON-SUPER-MARE, ENGLAND. MR. SYDNEY J. WILDE, ARCHITECT, WESTON-SUPER-MARE, ENG.

The erection of this church will shortly be commenced. The local blue limestone with Bath stone dressings will be employed in building the external walls. The interior (except the chancel, which will be lined with freestone) will be lined with buff-bricks with Bath stone dressings, and red rubbers for bands and voussoirs of arches. The shafts of the arcade columns will be of red Mansfield stone. The church when completed will provide seats for about 800 persons.

THE TAKING-DOWN FROM THE CROSS.

From a cartoon by G. Guffens.

Owing to the late arrival of a steamer we were unable to publish this in its proper sequence.

Books and Papers

We welcome Mr. Moore's book[1] with unalloyed satisfaction. For some generations past much sentimental admiration, and even enthusiasm, have been both in England and America displayed towards Gothic architecture. Its picturesque and poetic aspects are indeed so pronounced as naturally to excite such emotions in the minds of those who are sensible to what is grand or impressive in art or nature. But of real knowledge and appreciation of architecture, whether Gothic or other — such knowledge and appreciation as must form the basis of any justified opinion — there is to this day perhaps less than in regard to any other branch of art. This is partly, no doubt, to be accounted for by the absence of any adequate or satisfactory literature on the subject in the English language. Literature can, indeed, not always be relied on to create either interest or knowledge, as has been abundantly proved in France, where in spite of the flood of light which has been thrown on the native architecture by Viollet-le-Duc, Quicherat, De Caumont, Lenoir and other French writers, it still remains, in the epigrammatic words of Victor Hugo, "*inconnue des uns et méconnue des autres*"; regarded as indeed an interesting phase in architectural history, but as hardly worthy to be reckoned among those serious studies which the State engages to teach to its pupils. But this indifference rests in France on an intellectual bias which does not exist in the Anglo-Saxon mind — the bias in favor of the Classic

[1] "*Development and Character of Gothic Architecture.*" By Charles Herbert Moore. London and New York: Macmillan & Co.

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spirit and the Classic forms, and it is probable that in England and America there is more knowledge and appreciation of Gothic architecture than of Classic

Such as it is, however, it stands sadly in need of increase and improvement, and in this view we regard Mr. Moore's book as of very great importance and value, as calculated to give definiteness and precision to the conception of Gothic architecture.

He has elucidated, as no English or American writer has done before, the principles on which Gothic construction rests, and the successive steps through which it reached the completeness and perfection of Amiens and Rheims and Paris; and he has shown the peculiar closeness of the connection between construction and design which distinguishes true Gothic perhaps above all other architectural styles. It is a work involving long and patient research, the most careful personal examination of the typical monuments of the style in France and England, and a comparison of their individual features in which the type was subject to continual variations. Mr. Moore has done the work so thoroughly that we cannot see that it will need to be done again.

His primary object is to displace the prevailing notion that Gothic is a matter of design only — that a building is Gothic if it has pointed arches and a particular class of mouldings and other details. So far is he from admitting this to be the important point, that he goes to the opposite extreme and maintains that the style is dependent mainly on construction. "It is only," he says, "in a secondary sense that it is correct to speak of styles as different, in which there are no fundamental *structural* differences. Pointed architecture is not, in the strict sense, a style distinct from that which is round-arched, for pointed arches in apertures do not differ essentially from round ones." Mr. Moore adopts, as his foundation, the admirable exposition of the development of the Gothic style which M. Viollet-le-Duc has given in his "*Dictionnaire*," and which he thus summarizes: "He has shown that Gothic architecture came into being as a result of a development of a new constructive system of building. A system which was a gradual evolution out of the Romanesque, and one whose distinctive characteristic is, that the whole character of the building is determined by, and its whole strength is made to reside in a finely organized and frankly confessed framework rather than in walls. This framework, made up of piers, arches and buttresses, is freed from every unnecessary encumbrance of wall, and is rendered as light in all its parts as is compatible with strength in a system whose stability depends not upon any inert massiveness, except in the outermost abutments, but upon a logical adjustment of active parts whose opposing forces produce a perfect equilibrium. It is thus a system of balanced thrusts as opposed to the former system of inert stability. Gothic architecture is indeed much more than such a constructive system, but it is that primarily and always. And so fundamental and far-reaching is this mode of construction as the distinctive principle of Gothic, that it may be taken as a rule that wherever we find it developed, there we have a Gothic building even though the decorative system connected with it may retain many of the Romanesque characteristics. And, on the other hand, wherever this principle of thrust and counterthrust is wanting, there we have not Gothic, however freely the pointed arch may be used and however widely the ornamental details may differ from Romanesque types."

This theory of the essential characteristic of Gothic architecture Mr. Moore follows loyally to its utmost limit; tracing first the rapid evolution in a single half-century of the complete Gothic cathedral from the Romanesque church; the development of the vault with its system of independent ribs, the adjustment of vaulting shafts in groups, of which each member carried its particular rib, the gathering of the weight and the thrusts of the vaulting at fixed points on the external wall where they are met by the flying-buttresses, the gradual disappearance of the wall between the buttresses and the enlargement of the window till it fills the whole space under the longitudinal vault-rib, and finally the clothing of this framework with its appropriate decoration of sculpture. In this account we have for the first time in English, so far as we know, a clear, compact, complete and accurate statement of one of the most remarkable continuous and logical developments in the history of art, of which the result was the matured and completely organized Gothic cathedral. Mr. Moore declares, and we think he is justified in declaring, that in its perfection this creation exists only in France, and that the so-called Gothic churches of other countries are but imperfect and, for the most part, pale reflections of it, presenting many of its forms, and embodying some one portion and some another of its constructive framework. To these imperfectly developed churches he, therefore, denies the name of Gothic, characterizing the architectures of Germany, Italy and Spain as Pointed architectures, and as, for the most part, "totally different in their nature" from the Gothic of France.

Well, it is, perhaps, no more than a matter of definition, but it seems to us scarcely worth while to be so rigorously exclusive. If a man were denied the name of Christian unless he possessed all the Christian virtues, the Church would languish; and we can all recall a goodly number of churches, both great and small, in France and England, in Italy and Spain, which could not pass Mr. Moore's test of completeness, but which in character and feeling belong to the same great family with the majestic cathedrals of the best age in France. Mr. Moore regards certain features of a completely Gothic church as fundamental which we cannot regard as other than points of detail, and as constructive which seem to us features of design. The presence of the longitudinal wall-rib, the assignment of a distinct vaulting-shaft to each rib of the vault, the connection of the vaulting-shafts with the nave-piers, the abolition of the clerestory wall — these are, indeed, features which determine and illustrate the Gothic cathedral in its highest and noblest development, but they are not fundamental, and they are so far from being points of construction that in every case where they exist the conditions might be reversed without sensibly affecting either in one way or the other the stability of the building. They are points of design, by which the construction is expressed and emphasized, and they illustrate most forcibly the artistic instinct of the great mediæval builders, and the fastidiousness and refinement with which they studied to perfect their designs.

Mr. Moore follows his story of the rise and development of the French Gothic with a condensed account of "Pointed construction" in England, Germany, Italy and Spain. In the first of these chapters, his analysis of the English churches seems to us eminently just as well as historically complete. He states emphatically enough, but not too strongly, their inferiority at all points to the French churches, and justifies his statement by abundant illustration and argument. Of the architecture of the Continental nations outside of France, his account is less complete than we could wish, less than ten pages of text being given to Italy, and less than five to Spain. We hope that in another edition he will think it worth while to expand this portion of his work; and, when this is done, we are sure we shall not see the Cathedral of Milan dismissed with a contemptuous line as "in many respects but a travesty of Gothic." The statement is true, no doubt, but how far is it from being the whole truth, or even the chief truth, concerning this great church, of which the interior is, in spite of all obvious criticisms, one of the noblest and most impressive in the world.

Mr. Moore has an admirable and most instructive chapter on the sculpture of the French cathedrals — an alluring subject, which we are glad to see treated by a hand at once so loving and so judicious. No great school of plastic art has ever, we believe, been so little appreciated as the architectural sculpture of the Middle Ages. It has commonly been estimated according to its greater or less resemblance to the Classic sculpture of antiquity or to that of the Italian Renaissance; and such a standard is absurd, because the conditions under which the respective works were produced and exhibited, and the purposes they were made to serve, were absolutely different. The Gothic work is architectural or associative sculpture, and is to be judged in its associative character as an integral part of the architecture, and as such it has never been equalled in any age for force, variety, expression and appropriateness.

The book is amply illustrated with nearly two hundred wood-cuts, well-chosen and of somewhat unequal merit; the best being those from Mr. Moore's own admirable drawings, and the worst some of the general views copied from photographs.

A book so comprehensive, so compact, so clear in statement and so interesting in the treatment of its great subject, is well-suited not only to increase the general knowledge of Gothic architecture, but to become a text-book for special students, and we are glad to know that it has already been adopted as such in one of Mr. Norton's courses at Cambridge.

The Architectural and Building Monthly is the title of a new journal which has lately been added to the ranks of periodicals devoted to the interests of architecture and building. It is published by A. J. Bicknell, New York, and each issue contains a number of illustrations from original drawings.

SOCIETIES

THE CINCINNATI CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE Architects of Cincinnati met at 2 o'clock P. M., April 22, 1890, for the purpose of reorganizing the Chapter in that City. Nine members were present.

President McLaughlin called the Cincinnati Chapter A. I. A. to order, and, upon motion of Mr. Rapp all members of the Cincinnati Chapter W. A. A. were admitted to membership in the new Chapter. This was done so as to merge the two societies into one. The motion was carried. The meeting then adjourned for five minutes and the Cincinnati Chapter W. A. A. was called to order, and, upon motion adjourned *sine die*, thus consummating the consolidation of the two organizations into the Cincinnati Chapter of American Institute of Architects, which was again called to order and the following officers were elected to serve for the year beginning the third Thursday in April:

Samuel Hannaford, *President;* George W. Rapp, *Vice-President;* Chas. Crapsey, *Secretary,* and H. E. Siter, *Treasurer.*

Mr. Rapp moved that the old Charter of the Cincinnati Chapter of the American Institute of Architects be hunted up; this motion was carried and the Secretary was appointed as such Committee.

Upon motion a Committee of two were appointed to look up quarters for the Chapter and report at the next meeting. The chair appointed as such Committee, Messrs. Siter and Rapp.

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Upon ballot the meetings were fixed for the third Thursday of each month at three o'clock P. M. Matters of general interest to the profession were discussed and upon motion the meeting adjourned. Charles Crapsey, *Secretary.*

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

QUEBEC AND MONTREAL ARCHITECTS — THE PROPOSED FORMATION OF A PROVINCIAL ASSOCIATION.

Montreal, Canada, April 23, 1890.

To the Editors of the American Architect: —

Dear Sirs, — In your issue of the 19th instant you say in Canadian news that "the architects of the province of Quebec are talking about the formation of a Provincial Association and seeking legislation on the lines of the Association of Ontario." So far you are right, but the other particulars I beg most respectfully to contradict.

A meeting of over twenty architects was held in Montreal and both English and French members of the profession were most enthusiastic in the formation of a society and elected an organizing committee to report at an early meeting.

It was the wish of the meeting that the scheme should take the form of a Provincial one, and the architects in Quebec have been written, to get their co-operation.

I have so far failed to see that the French and English architects in this province are "separated by a wide gulf."

"This natural racial dislike" — as you state — does not appear among our architects here. We may have our trivial jealousies. What professions have not? And so far from a feeling of "hatred" of each other, there is a close and friendly brother-feeling, as our quiet and business-like meeting proved.

I hope you will rectify your misleading statements in your next issue and wish us success in our undertaking.

Respectfully yours, Chris. Clift,
Secretary pro. tem.,
Proposed Architectural Association for Province of Quebec.

BOOKS ON POMPEIIAN ARCHITECTURE.

To the Editors of the American Architect: —

Dear Sirs, — I am desirous of obtaining some books on the architecture of ancient Pompeii, and also some views of some of the dwellings of the patricians of that city, if such views are obtainable. Will you kindly advise me in the matter if you have any such information at your command? Your kind attention will be appreciated by Yours very truly, X.

[Sir William Gell's book on Pompeii is the fullest. Owen Jones's "*Grammar of Ornament*" gives ideas of the color-decoration, as does also Racinet's "*Ornement Polychrome*" and Racinet's "*Costumes,*" which contains very clever colored interiors. There are many other books on the subject. — Eds. American Architect.]

BOOKS.

Philadelphia, Pa.

To the Editors of the American Architect: —

Dear Sirs, — Some time since I wrote you for information concerning books upon certain stated subjects; viz., a good work upon masonry construction — sewers, bridges and buildings; a work treating upon the geology, etc., of building-stones; a work upon theatre planning and construction. I have received no reply thereto. As I have in the past received some valuable assistance in this direction from you, your attention will greatly oblige

Yours truly, Herbert P. Kelly.

[The best book on masonry construction yet published is Professor Baker's "*Treatise on Masonry Construction.*" A report was published some time ago by the United States Government on the "*Building Stones of the United States,*" which is the best authority on the subject. For the general subject, perhaps the South Kensington text-book on "*Materials*" would be as useful as anything. For theatre planning and construction, the appropriate chapter in "*Gwilt's Cyclopædia,*" with a comparison of articles and plans in the technical journals, is the most available material in English. There is an antiquated French book on the subject, in several volumes, and Garnier, after the completion of the Opéra, published a book on "*Le Theatre,*" which is useful; but the modern construction of theatres is a very different affair from that of twenty-five years ago. — Eds. American Architect.]

BOOKS ON ARCHITECTURE.

Chicago, Ill.

To the Editors of the American Architect: —

Dear Sirs, — As I think you are well posted about books pertaining to architecture, I wish to ask if you can recommend Nicholson's "*Architecture*" as a good book for a student's use, and if there are any others that you think are better, please let me know. Trusting you will favor me with a reply when convenient.

Yours, Ole A. Schye.

[Nicholson's "*Architecture*" is a very old-fashioned book, but a good and thorough one of its kind. His chapters on Carpentry and Joinery are the best that we know of in any book. Gwilt's "*Cyclopædia of Architecture*" is, perhaps, the most useful single book for a beginner. — Eds. American Architect.]

BOOKS ON PLUMBING AND DRAINAGE.

New York, N. Y.

To the Editors of the American Architect:

Dear Sirs, — What do you consider the best publication from which one can learn not only the principles of plumbing and drainage, but also the proper method of making drawings for same.

Yours, etc., T. P. N.

[Bayle's "*House Drainage and Water Service*"; Buchan's "*Plumbing,*" W. Stevens Hellyer's books, and those by J. P. Putnam, W. P. Gerhard and others. — Eds. American Architect.]

BYZANTINE AND RENAISSANCE ORNAMENT.

Buffalo, N. Y.

To the Editors of the American Architect: —

Dear Sirs, — I am in want of some good illustrations of the Byzantine ornament and carvings; also, of the Italian Renaissance. I wish you would inform me what you can recommend representing nicely those styles of architectural carving.

Very respectfully yours, Wm. T. Cross.

[If you mean what is now called Byzantine ornament, the examples generally followed are those shown in Revoil's "*Architecture Romane,*" which has been republished here. The real Byzantine work is, perhaps, best studied in Ruskin's "*Stones of Venice*" and photographs of Venice and Ravenna, and in the photographs of St. Sophia at Constantinople. The books on Byzantine architecture in Asia, such as those of Texier and Pullan, contain little useful detail. For the Italian Renaissance, there are many excellent books, but perhaps the most useful studies for carving would be found in Raguenet's serial publication, back volumes of which can be readily obtained. — Eds. American Architect.]

PROCESSES FOR COPYING PLANS.

Montreal, Can.

To the Editors of the American Architect: —

Dear Sirs, — Would you be so kind as to give in the *American Architect* more details on the process of copying plans (as said to be used by Messrs. Burnham & Root, in a previous note in the *American Architect* and in *Engineering and Building Record*). I would be pleased to know the working of such a process, in so far as it would not interfere with the professional privileges of the promoters of the idea. Yours, J. Venne.

[All we know is what has been published. Possibly Messrs. Burnham & Root may be willing to make the process public, for the benefit of the profession, but we imagine that skilful manipulation has a good deal to do with its success. — Eds. American Architect.]

BOOKS AND PRINTS.

Galveston, Tex., March 15, 1890.

To the Editors of the American Architect: —

Dear Sirs, — I trust you will pardon me for my boldness in writing you this letter, but if you will kindly give the answers to the following questions I will feel very grateful to you.

I am studying architecture and noticed the sketches in Normandy, by Herbert Railton, published in the *American Architect* of February 22.

I wish very much to study this style of sketching, and would be pleased if you would tell me if I can obtain them in book form, from whom, and the price. If I cannot get this, will you please recommend one in the same style.

Would you also tell me the price and publishers of a standard work on the different architectural styles.

Also if I can obtain photogravures from the old editions of the *American Architect* separate from the text, and if so at what price per dozen. Trusting you will have the kindness to answer, if possible, I am, yours respectfully, F. J. M.

[We do not think the Railton sketches can be had in book form. "*Coaching Days and Coaching Ways,*" by W. Outram Tristram, contains many illustrations by Railton, and numerous reproductions of his sketches may be found in the *English Illustrated Magazine.* The best books of sketches are those of Samuel Prout, published many years ago. The best book on architectural styles is Fergusson's "*History of Architecture,*" published by Dodd & Mead, New York, price about $5 to students. The gelatine prints, which we suppose are meant, can be obtained most cheaply by buying the back numbers of the *American Architect* in which they have appeared, and which can generally be supplied, at 15 or 25 cents each, according to the edition which contains them. The International edition, which began this year, and contains nearly all the real photogravures, besides the principal selection of gelatine plates, can only be had by subscription, as the edition is limited. — Eds. American Architect.]

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L. S. BUFFINGTON ARCHITECT
MINNEAPOLIS MINN. A.D. 1888.

PILL. HALL UNIVERSITY OF MINNESOTA.

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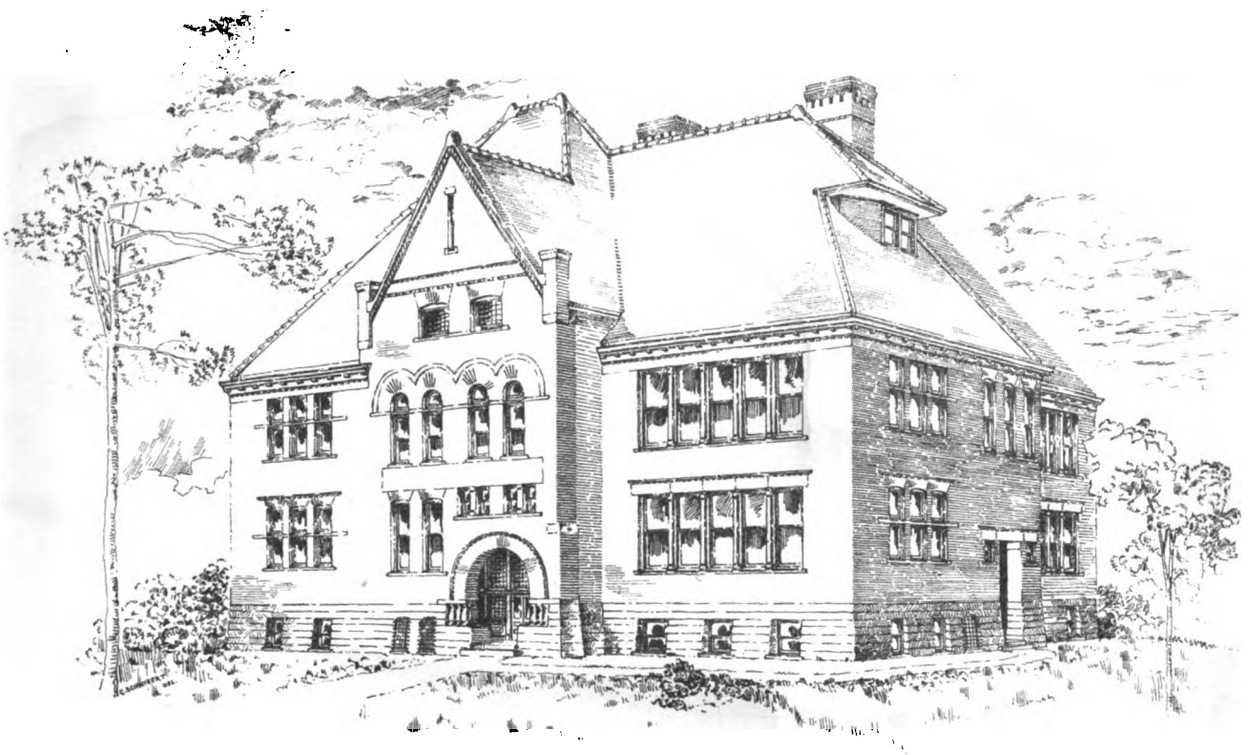

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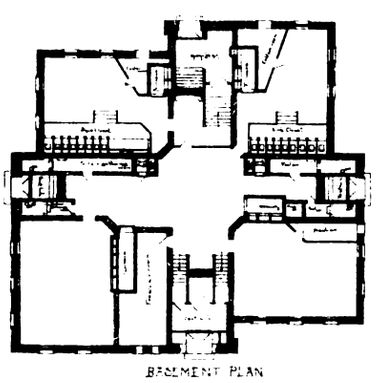

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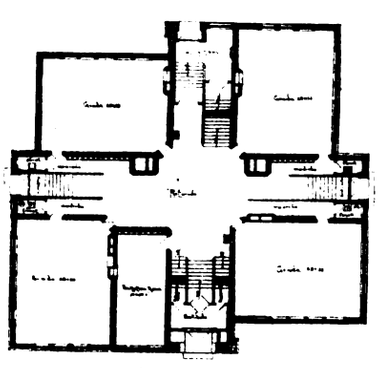

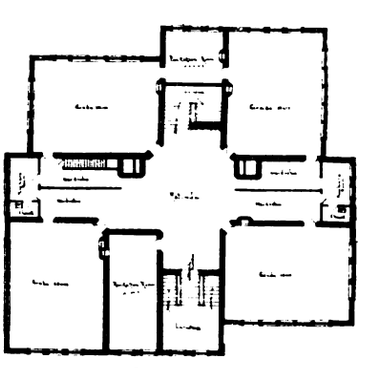

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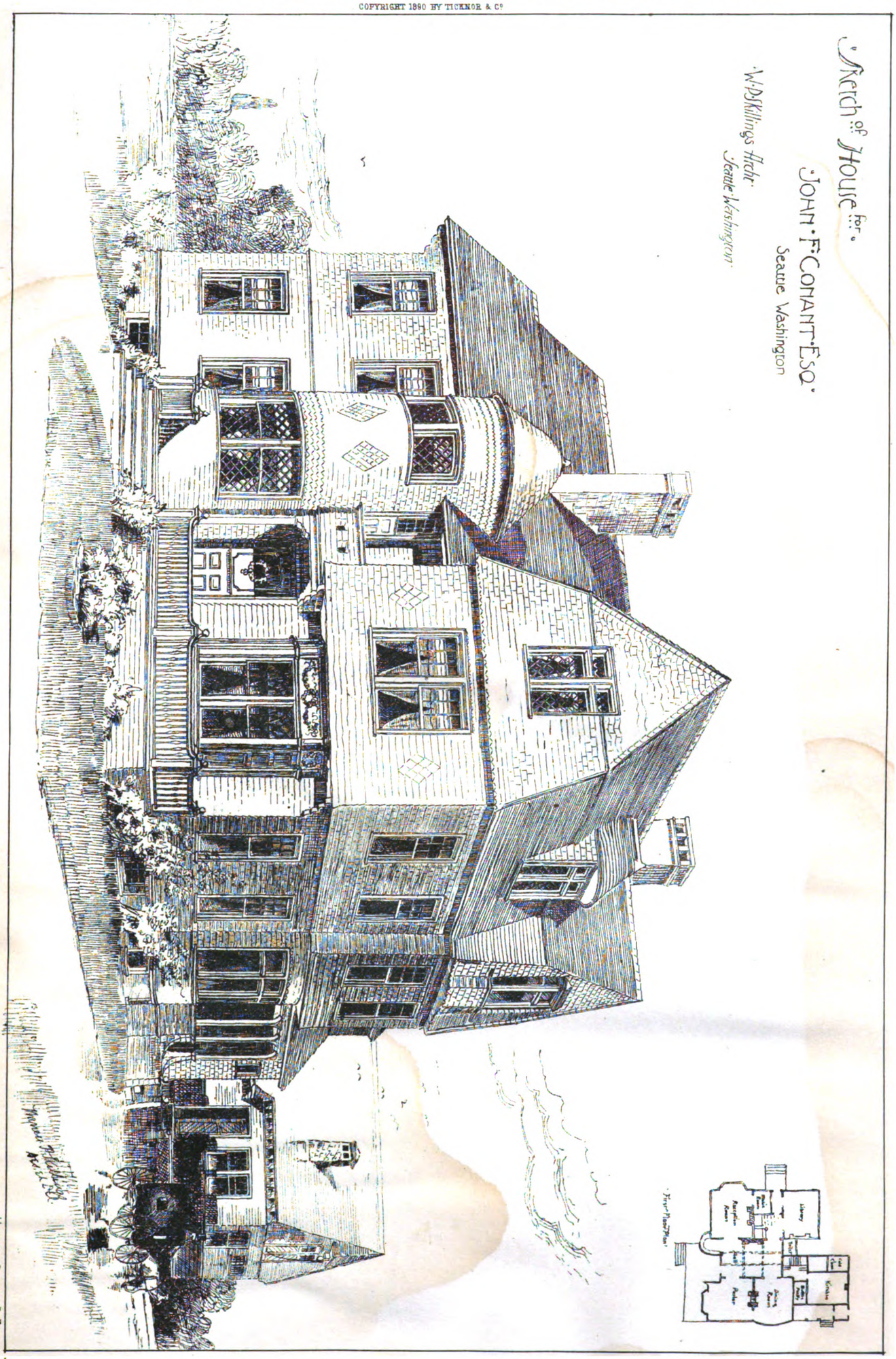

Sketch of House for
John F. Conant Esq.
Seattle Washington
W. D. Kellings Archt.
Seattle Washington

First Floor Plan

Heliotype Printing Co. Boston

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NEW YORK ARCHITECTURAL LEAGUE COMPETITION
ENTRANCE TO WORLD'S EXPOSITION

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~ METHOD OF FRAMING ABOUT CHIMNEYS. ~

~ PLAN FIRST FLOOR. ~

~ PLAN SECOND FLOOR ~

~ STUDS ARE SHOWN IN SOLID BLACK ~

SECTION A B.

SECTION C D.

~ METHOD OF SUPPORTING PARTITIONS. ~

~ SPRUCE FRAME FOR A TWO STORY HOUSE. ~

~ DESIGNED SO THAT THE SHRINKAGE SHALL BE UNIFORM ~

NOTE: TO MAKE THE DRAWING CLEARER PART OF THE FRAMING HAS BEEN REMOVED. ~

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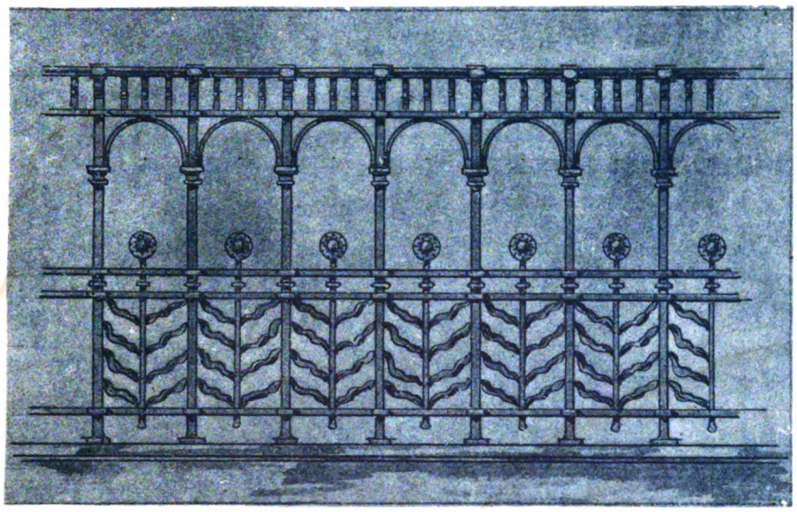

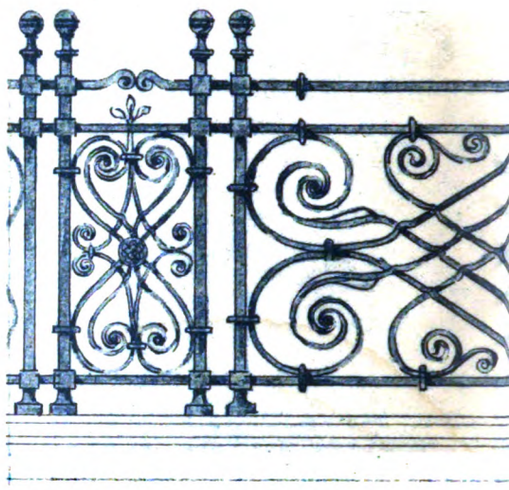

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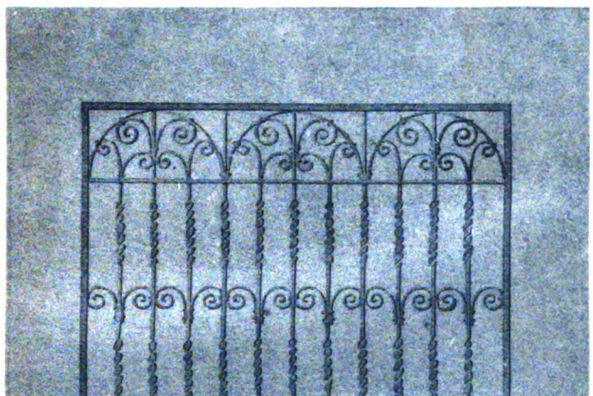

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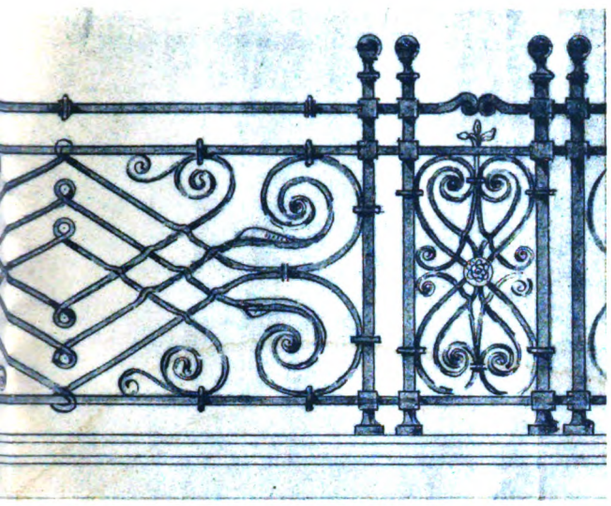

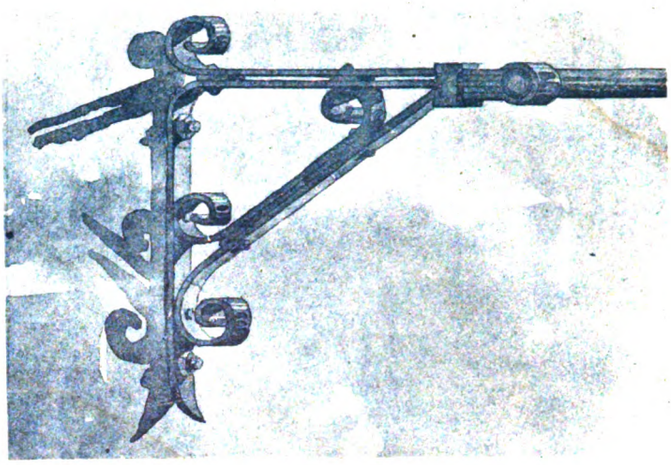

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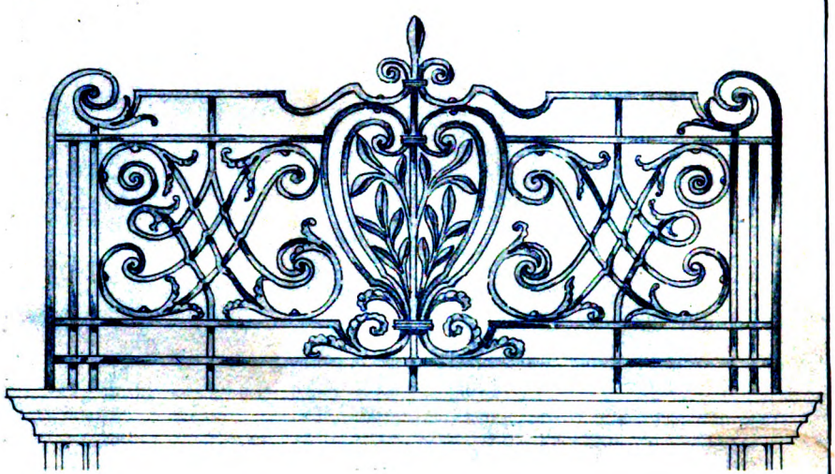

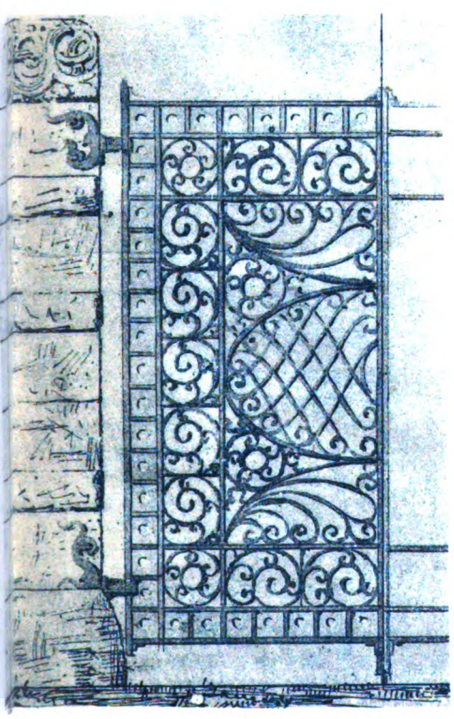

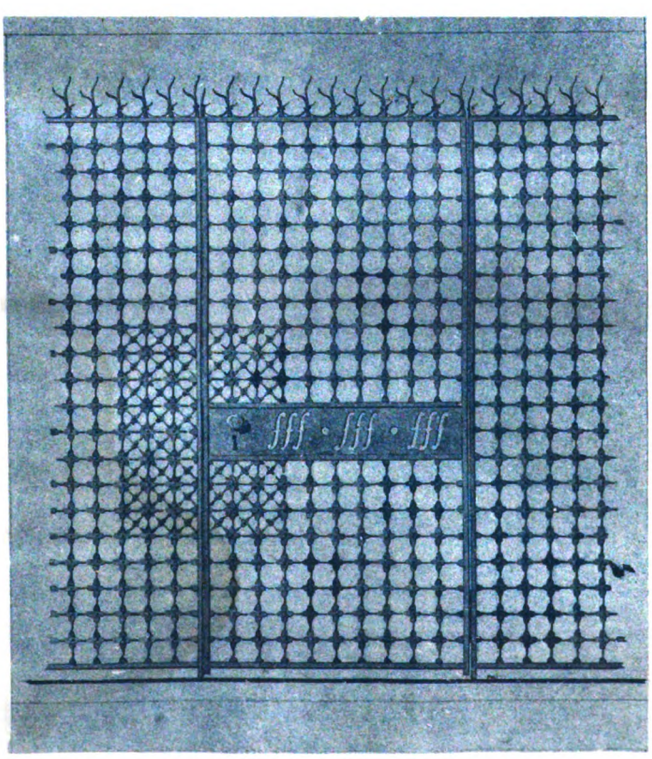

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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MAY 10, 1890.

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WE regret extremely to learn of the death of Mr. Henry O. Avery, one of the most accomplished and energetic of the younger architects of the country, and a devoted worker for the good of the profession. Mr. Avery was originally a pupil of Professor Russell Sturgis, but went to Paris in 1874, and spent nearly seven years in the School of Fine Arts. On his return to this country, he entered, as an assistant, the office of Mr. Richard M. Hunt, and took an important part in the designing of the famous houses of Messrs. W. K. Vanderbilt and Henry G. Marquand. His subsequent practice on his own account, although it had been carried on for only a few years, had brought him distinction, but his principal claim to the remembrance of architects will come from the unselfish zeal with which he endeavored to promote the cause of art. He was perhaps the leading member of the Architectural League, an officer of the Archæological Institute, and prominent in the new Society of American Artists. His early death will be a severe loss to the community, as well as the profession, and it will be long before his place is filled.

A JOINT meeting of the Senate and House Committees on Public Buildings and Grounds was held in Washington the other day, for the first time in eight years, to consider sites for the erection of new buildings for the Interior Department, the General Post-Office, and the City Post-Office for Washington. We sincerely hope that an effort will be made to have these important structures decently worthy in design to stand among the other great public buildings of Washington. Up to this time, the artistic value of the principal architectural objects at the Capital of the nation has been pretty steadily deteriorating. The White House, the oldest of them, is a beautiful and delicately studied building; the Capitol, in its present shape, is a monument of which the nation may well be proud; and no one need be ashamed of the Patent Office and the Treasury; but of some of the later structures the less said the better. If the opportunity to add to the noble group of huge Classical buildings which distinguishes Washington is lost now it will never recur, and a sample of the "dropsical Romanesque," or the "American Ovo" style of architecture, carried out on the gigantic scale demanded for the Government Buildings, would be painfully ridiculous beside the Capitol.

A CURIOUS light is thrown on certain features of labor agitations by the accounts of the strikes at Barcelona last week. Barcelona is a turbulent place, infested with anarchists and mischief-makers, who, as elsewhere, tried hard to stir up disorder. The first-of-May strikes took place, as ordered by the International Society, and the strikers, or rather, the evil-disposed among them, took to roaming the streets, tipping over and smashing horse-cars, and doing other mischief, to the terror of the peaceable citizens, while the anarchists placarded the walls with proclamations, announcing that "the hour for the social revolution had come," and calling upon the strikers to pillage the city. The Governor, however, finding that his force of police was not large enough to preserve order, called for three regiments of troops, and requested the factory-owners and other employers of labor to continue their operations, for the benefit of those persons who were willing to work, and gave notice that death would be the penalty for any interference on the part of the strikers with the liberty of persons who chose to work, instead of joining them. One cannot help being a little envious, to think that this bold and intelligent defender of liberty should have been a Spaniard, instead of an American, but we may with advantage remember the results of his energy. The next morning, many workmen, finding that a strong hand was ready to protect them, crept back to their benches and tools, and at last accounts their example was likely to be generally followed.

SIMILAR results would, as we believe, follow in this country, to the inestimable advantage of every one except the professional agitators and thieves, if any one in authority would, during a season of strikes, pluck up the courage necessary to vindicate that universal liberty which we claim as the American birthright. Few persons realize the terrorism by which the selfish and unscrupulous leaders of the labor organizations, through the subordinates whom they recruit in the saloons, coerce into obedience the sober and intelligent workmen who, in most trades, really constitute the majority of the members. We, architects, like other American business men, are secure against "boycotting," "rattening," and the other forms of persecution which are applied to our poorer brethren; but the law which protects us is silent in the defence of men who live by the work of their hands, and no one seems to think of raising a hand to help them. On the contrary, the contemptible politicians, and the still more contemptible cheap newspapers, by which our country is cursed, fall down and worship the walking-delegates, and the demagogues who direct them, flattering and coaxing the worst tyrants who exist outside of Russia, and legislating year after year, at their bidding, to strengthen them further, and more effectually to crush the opposition which a few independent spirits would still venture to offer them. We believe, with the Governor of Barcelona, that the appropriate penalty for the attempt, on the part of men who do not choose to work, to prevent others from working who wish to do so, is death, and we should like to include in the sentence the miserable politicians who can stand by and see honest mechanics hounded from shop to shop by the walking-delegates, because they choose to work on terms to suit themselves, and to give the money they earn to their wives to take care of, instead of to the Unions, and can then bargain with the Union leaders for votes secured by fear of such persecutions, in return for the enactment of laws intended to facilitate and extend their tyranny.

THE story of the settlement of a pier in the great drawbridge at New London, to which we recently referred, proves to have been greatly exaggerated. A settlement of about four inches has taken place, and the ice-breaker is slightly cracked; but the settlement has nearly ceased, the total movement for several months past having amounted only to about one-eighth of an inch, and there are no cracks in the main pier, which indicates that the compression of the soil under the masonry has nearly reached its limit. Trains, therefore, run over the bridge at the ordinary speed, and no apprehension is entertained of further trouble.

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MR. FRANK FURNESS, a well-known Philadelphia architect, has invented a system of concrete flooring which appears to have certain merits. Mr. Furness first lays his floor with wooden beams, two feet from centres, each beam having an angle-iron bolted on each side, with a washer between the angle-iron and the beam, three-eighths of an inch thick, so as to permit the concrete, subsequently put in, to envelop the iron on all sides. A strip, triangular in section, is nailed on the lower edge of each beam, with the edge down. Boards are then nailed over the underside of the joints, and concrete, made with one part Portland cement to three parts sand, and an equal quantity of broken stone, is filled-in over the boarding five inches thick. The cost is said to be only a trifle more than that of an ordinary wooden floor, but we must confess that we do not understand the calculations by which this estimate is obtained. As the floor is described, the concrete is carried by the beams, and adds nothing to their strength; consequently, the wooden joists and the angle-irons together must be considerably stronger than they would be for an ordinary floor, as they have the concrete to carry, in addition to the weight, inherent and superposed, of the floor. As the angle-irons, used as floor-beams, cost much more than wooden beams of the same transverse strength, it follows that the beams of the new floor will cost considerably more than they would for an ordinary floor — probably at least twice as much in most cases. Moreover, the new system does not promise any saving in the expense of the floor-boarding, although, as the floor-boards in either case would be simply nailed to the joists, it involves no extra expense; but the cost of the ceiling would be greater by the new method. It is true that plastering could be applied directly to the underside of the concrete, thus saving the cost of lathing; but the use of concrete involves boarding the ceiling all over, and the cost of putting up and taking down boards, with the waste involved, would far more than offset the cost of lathing. The obvious result, therefore, appears to us to be that Mr. Furness's plan affords a good fireproofing, at a material increase of cost over that of an ordinary floor. That the concrete is only for fireproofing the joists, and is not intended to carry weight, is shown by its composition, as a six-to-one concrete of Portland cement, five inches thick, not rammed or consolidated in any way except by raking evenly into place, could not be depended upon to do more than carry its weight, and that of the plaster ceiling, over a two-foot span, and we should doubt its capacity for doing that with certainty.

THE practice of fireproofing wooden floors by putting concrete between the joists, although a useful one, is by no means new. We employed it ourselves twelve or fifteen years ago, following the example of other architects of our acquaintance; but ours was a simpler method than Mr. Furness's. Instead of bolting angle-irons to the sides of the joists, we put on wooden strips, well nailed, an inch and a half or so above the bottom of the joists, which were only about sixteen inches from centres. Boards were then put up against the underside of the joists, not nailed, but held in place by supports beneath; and a concrete of lime-mortar, plaster-of-Paris and cinders was poured in to a depth of a few inches, and brought well up on the sides of the joists. After setting, the concrete slabs were held firmly in place by the fillets on the beams, and furnished a good surface for plastering on, the plaster easily spanning the width of the joists, so as to protect them from fire. The same thing was then, and probably still is, done in Paris with wooden joists two feet or more from centres; but in this case it is usual to give additional support to the concrete, which is there made of old plastering rubbish, or "platras," grouted with plaster-of-Paris, by means of slender, square, iron bars, or rather wires, which are hooked over two joists, and hang down between them, nearly to the ceiling level. With these wires, which are put in a foot or so apart, the concrete is well supported. There is no doubt that construction of this sort is becoming rapidly popular in this country, and architects will do well to exchange views and experiences on the subject, for their own benefit, as well as that of their clients. The great danger to be apprehended is that of decay of the wooden joists, which, if buried on two sides in so compact a material as Portland-cement concrete, plastered and painted underneath, and covered on top with a double floor, probably with felt between the floorings, are in a rather unfavorable position in this respect. Of course, the proper material to use is iron, but under present circumstances, this is out of the question in most cases, and it is for us to devise porous concretes, or to secure in some other way the circulation of air around the joists which experience shows to be essential.

PROFESSOR BLAKE, of the University of Kansas, makes a valuable suggestion for testing well-water for sewage contamination. The ordinary way, where contamination from a given cesspool, vault or sewer is feared, is to pour salt water into the suspected source of contamination, and, after a time, to test the well-water for salt, by means of nitrate of silver. In fact, as salt is always present in considerable quantity in sewage and house-wastes, the presence of salt in well-water is presumptive evidence of contamination. It is not, however, positive evidence, as many innocent soils contain chlorides, and Professor Blake proposes that a lithium compound should be used instead of common salt. Lithium is a substance so rare that it would hardly be found in any natural soil, and a very small quantity can be detected by means of the bright red line which its spectrum shows in the spectroscope. According to the best authorities, one forty-millionth of a grain of lithium will give the red line clearly. Professor Blake proposes to make the test by dissolving one ounce of carbonate or chloride of lithium in a quart of water, and pouring the solution into the suspected cesspool or vault. After a week or more, the well-water is examined, by evaporating a little of it, dipping a platinum wire in the concentrated liquid, and holding the wire in a Bunsen gas-flame. If, on looking at the flame with a spectroscope, the lithium line is seen, the contamination is proved.

ONE of those astonishing letters from old mechanics, or distinguished inventors, or retired military men, or other persons, announcing the discovery by them of not merely improved, but almost miraculous methods of building, by which all the defects commou to houses designed by architects are done away with, appears in the New York *Evening Post*. The letter, which is attested by a professor, describes an ingenious and delightful device invented by the writer, who appears to be a builder, consisting in carrying the under floor in balloon-framed houses to the outside boarding, and laying a few rough bricks on it, between the studs, as if this were something new. In point of fact, it is an inefficient practice, which was once commonly used among architects, but which, as it prevents back-plastering below the floor-lines, and does not prevent fire from running up the studding and spreading into the spaces between the beams, has been superseded by the far better method of cutting-in short pieces between the studs, just below the ceiling, and, after back-plastering, building up with bricks and mortar on these pieces to the level of the floor, so as absolutely to prevent fire from below from getting into the spaces between the beams. Many architects not only cut off the spaces between the beams in this way from the spaces between the outside studs, but build up with brick on top of all partition-heads to the under-side of the floor-boards, so as to divide the beam-spaces into compartments isolated from each other. Another piece of advice which the *Evening Post's* correspondent gives is to have the plastering on outside walls carried to the floor, instead of to the ground. This, so far as we know, is the invariable rule in all but the cheapest class of "jerry" buildings in the Northern States, and most architects improve upon it by requiring the plastering to be carried to the floor on all inside partitions, as well as outside studding. Of course, we do not object to having the *Evening Post*, or any other newspaper, publish letters on the subject of making our ordinary houses safer, as well as more durable and wholesome, but we might suggest that most architects give more thought and attention to these matters every week than the average builder does in the whole course of his life, and that the best way to get something better than mere repetitions of observations which have been the commonplaces of the offices for twenty years is to apply for it to the people who have studied most thoroughly what has been done, and have spent the most ingenuity in devising new safeguards; that is, to the architects, to whom, and to the mill mutual insurance companies, is due nearly every improvement that has been made in the art of building in this country.

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RELIGIOUS ARCHITECTURE.[1] — V.

II. RELIGIOUS ARCHITECTURE OF ANTIQUITY. — ASSYRIA, PHŒNICIA AND PERSIA.

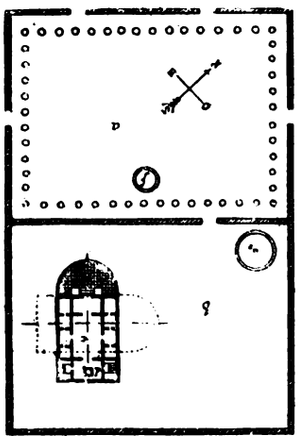

Fig. 12. Plan of the Temple of Paphos, Cyprus (before the 7th Century B. C.). After Gerhardt.

WE shall have but little to say about the temples of Phœnicia and her colonies, for the remains of them are so incomplete that it is impossible to obtain any reliable information concerning them.

Their design, which seems to belong by right to the Semitic race, had its origin in traditional religious customs quite unlike those we have encountered among the Egyptians; it comprises simply a very large uncovered room; in the centre of one of the extremities stands a tabernacle or ædicula, containing the mystic emblem of divine power.[2] This is the disposition which still prevails among the Arabs, except for the idol, which is found only in the most ancient edifice of Mussulman worship, the Ka'ba.

The great importance which the Asiatic Greeks gave to the peribolus in their temples was doubtless due to Phœnician influence. The space reserved for the temple annexes, and designed for the use of the people, was much more vast and much more richly decorated in Asia Minor than in Greece proper.

Little is known of the celebrated Temple of Paphos (Figure 12) beyond what can be learned from medals, which give outline representations of it. After a careful examination of the ruins, which are scarcely visible, Gerhardt and Cesnola have both attempted a reconstruction of the plan. The temple was 220 feet long by 164 feet broad, and the peribolus measured 689 feet by 538 feet; the outer wall was pierced by gates, traces of which have been discovered. It is supposed that court *a* was surrounded by porticos; *f* was probably a basin; in the second court, *b*, rose the temple proper, *c*, in the rear of which, at *d*, the ædicula must have stood which sheltered the sacred stone or *beryle;* the latter was usually of conical shape. It should be added that the restorations of Gerhardt and Cesnola are far from agreeing with each other.

At Golgos, where it has not yet been possible to discover any trace of the peribolus, the sanctuary is all that remains (Figure 13). According to Ceccaldi,[3] this ancient edifice may be thus pictured: "The temple was constructed of sun-dried brick, forming four walls, with the bases resting on stone foundations. In the interior, the roof, which sloped very gently in two directions, was supported on wooden pillars with stone capitals; it formed a sort of terrace, like the present Cypriot roofs. The roof itself consisted of wooden beams placed close together; above these reeds and mats were stretched, which were in turn covered by a thick layer of earth; this was well beaten down, and was impervious to dampness and heat alike. The external appearance of the Temple of Golgos must, therefore, have been very simple. In the interior, which was illuminated solely through the broad doors, a throng of mute and motionless stone personages, with features and vestments set off by paintings, surrounded the mystic cone as perpetual worshippers. Stone lamps, in the form of ædiculæ, lit up the frescos and the grimacing votive offerings suspended from the walls, in the recesses. Odd bas-reliefs were sculptured around the edifice, and the slanting light was reflected on white and polished flags." The pedestals of the statues described by Ceccaldi have, in fact, been found all along the walls, as is indicated in the plan; the statues lay on the ground. A part of the sacred stone has been discovered.

The Temples of Hagiar Kim and of the Giganteja, at Gozzo (Figures 14, 15, 16), are similar in general disposition. They comprise extensive halls opening into one another, with but little symmetry of form, and built of blocks of colossal proportions. The rooms are nearly ellipsoidal in shape. At Hagiar Kim, the chambers at the right of the plan seem more ancient, and they alone probably constituted the primitive temple; the room near the bottom must have been the chief sanctuary, judging from the richer and more nicely wrought decorations.

The four rooms on the left appear to have been constructed later; they were doubtless added to make place for secondary gods. The upper and the lower halls have small adjoining apartments, which were originally chapels.

We know from ancient authors that these mysterious retreats were the scenes of sumptuous and voluptuous celebrations, which powerfully impressed the imagination of neighboring peoples; but it must be confessed that it is difficult for us, owing to the insignificance of existing remains, to form any adequate idea of the enchanting spectacles described by these writers.

The little that can be learned of the temples of ancient Persia is due chiefly to the researches of M. Dieulafoy. The edifices of which traces are found in the plain of the Polvar are contemporary with the reign of Cyrus; this mighty monarch, after his victories over the Medes, founded at the head of the defiles of the Polvar Rud a capital from which he could at the same time watch over the kingdom of Auran, Fars and Media, and defend the entrance to his conquest.

These edifices were not the original work of the ancient or later inhabitants of the region; they were copied from the structures of Lycia and of the Greek colonies of Asia Minor.

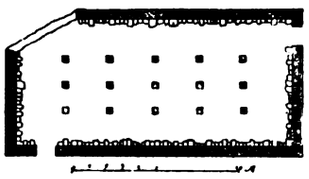

Fig. 13. Plan of the Temple of Golgos (3d Century B. C.). After Cesnola.

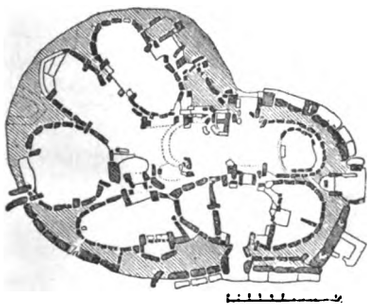

Fig. 14. Plan of the Temple of Hagiar Kim, Malta (3d Century B. C.). After Caruana.

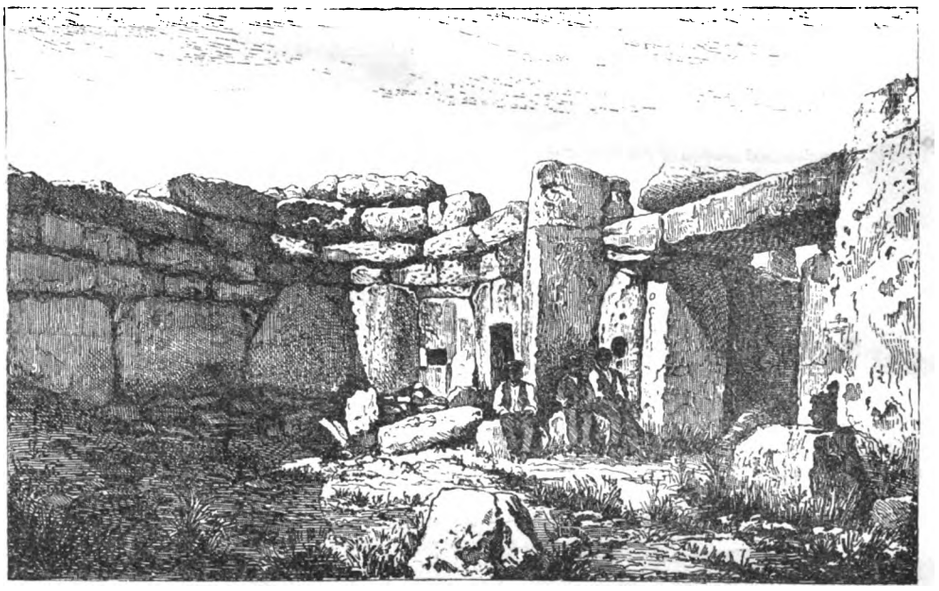

Fig. 15. A Hall in the Temple of Hagiar Kim at Malta. After Perrot and Chipiez.

[1] From the French of P. Planat, in Planat's "*Encyclopédie de l'Architecture et de la Construction.*" Continued from page 65, No. 749.

[2] Perrot et Chipiez. "*La Phénicie.*"

[3] "*Monuments Antiques de Cypre.*"

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Such imitations were very probably due to the influence of Crœsus, who became the friend and counsellor of his conqueror. Until the time of Cyrus the Persians had been accustomed to only the most modest constructions, which they built with clay mortar. As for religious architecture, none, as it were, existed; the worship of the Persians was always celebrated in the open air, with no temples nor consecrated edifices. Hardly would one note, in the royal tombs of the first Achemenides dynasty, the existence of small rooms, which seem to have been destined for some ceremonies connected with funeral services.

In the same way, the only architectural remains of the second dynasty are the royal palaces of Persepolis and the tombs of Nakschi-Roustam. At the most, we can only cite a few altars (*atech-ga*), in which no originality of design is discernible, and which seem to have been directly inspired by Greco-Lycian art.

If, for our special purposes, we are seeking only the forms peculiar to ancient Persian religious architecture, and if we have to regret that no vestiges of it can be discovered, the other Persian edifices of this first period are, nevertheless, of interest for our study; for we find in them, from remote antiquity, a most complete and satisfactory solution of the problem which so long occupied the builders of early Christian times and of the Middle Ages — a solution which strikingly influenced the development of religious architecture.

In the monument of Sarvistan (Figures 17, 18), the cupola of the large hall, made of brick, is separated by a cornice from its pendentives, which are built of small, unhewn stones. But the cupola is, in fact, borne by a squinch on the angle joined by these pendentives. The same construction (Figure 19) is found at Firouz-Abad.

Other rooms are covered with barrel-vaulting, generally of an elongated elliptical form. By a very curious method of construction, which was later employed by Byzantine architects, and which had already been in use among the Assyrians, the Persians were able to dispense with centring. This was, moreover, a necessity in a country absolutely destitute of forests and of wood for building purposes.

The intrados, says M. Marcel Dieulafoy, is divided into two zones; below the plane of the springing, bricks are laid horizontally and corbelling slightly below one another, and set successively on the face and on the edge. The joints are broad and the mortars of ordinary quality. The builder knew by experience that the springers of the vault would naturally maintain their equilibrium, and he seems to have treated them with no more care than ordinary masonry work. As for the upper part of the barrel, the bricks, instead of being laid in planes perpendicular to the heads, as in all European vaults, are disposed vertically, and in planes nearly perpendicular to the axis of the barrel (Figure 20). The joints are thin and the mortars of excellent quality.

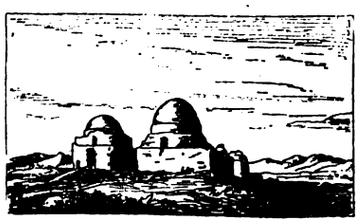

Fig. 17. View of the Palace of Sarvistan (5th Century B. C.).

"The mode of construction adopted at that time,[1] and which has since undergone no modification, is most ingenious. The following description of it applies not only to the barrel-vault of Sarvistan, but to all cylindrical vaults built by the Persians previous to the Arab conquest.

"The workman, having traced the right section of the intrados on the inner face of one of the end walls of the room to be covered, applies a first row of bricks, laid flat and following the curve adopted. Each one of these, if its thickness has been well calculated with relation to the surface and to the cohesiveness of the mortar, adheres separately to the face of the wall. When this first ring is keyed it presents a solid support, on which a second ring can be applied. Proceeding thus, the barrel is gradually prolonged; the mason advances at the same time, working on the extrados, and doubling or tripling the number of layers before venturing over the fresh masonry (Figure 21).

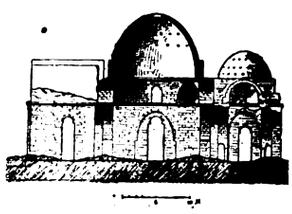

Fig. 18. Section of the Cupola of Sarvistan. After M. M. Dieulafoy.

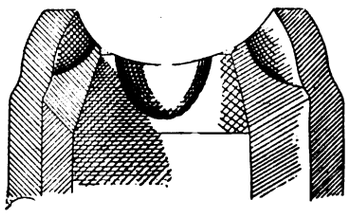

Fig. 19. Ruins of a Cupola of ancient Persia. After M. M. Dieulafoy.

"Above the springing of the arches the bricks maintained their equilibrium, whatever the curve of the intrados might be, and, as there seemed to be no call for modifying the direction of the lower courses of the barrel, they were laid horizontally,

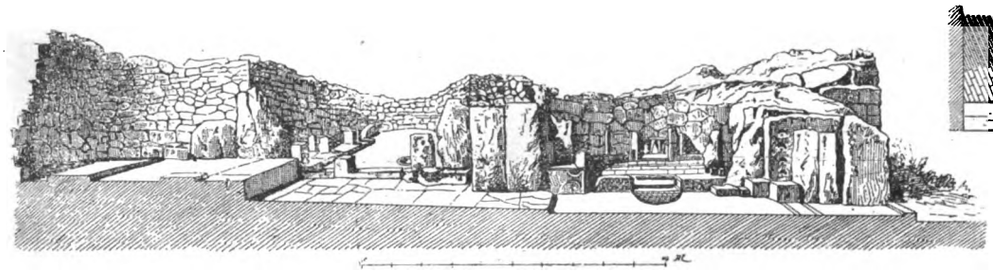

Fig. 16. Longitudinal Section of the Great Temple of the Giganteja, Gozzo (3d Century B. C.). After La Marmora.

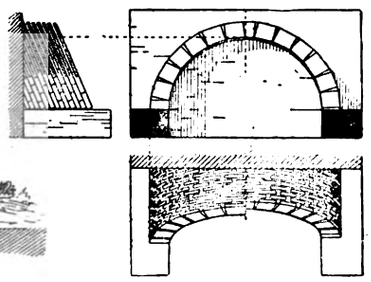

Fig. 20. Construction of an ancient Persian vault.

and corbelling slightly above one another, up to the point where the action of gravity tended to precipitate them into space.

"So that, from the springing of the arches to the joint of rupture, the masonry-work formed a homogeneous mass; while from the joint of rupture to the crown, the vaulting, which was turned according to the Persian rule, was constructed in thin layers, and was, in addition, formed of superimposed and isolated courses."

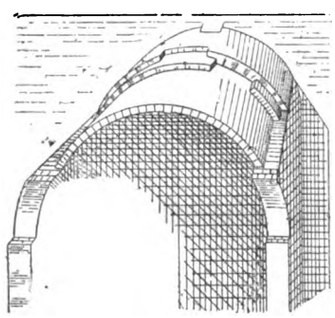

Fig. 21. Manner of Building Barrel-vaults. After M. M. Dieulafoy.

The Persians still have recourse to similar processes for building vaults without centring.

In the edifice at Firouz-Abad, which is certainly older than the above by one or two centuries, the same methods were employed, though with less symmetry and with more difficulty, owing to the use of the semi-circular arch. This form, in fact, is not as well adapted to the process as the stilted arch is, for it gives the key-stones, starting from the haunches, an obliquity which it is difficult to remedy.

Both edifices seem to belong to the second Achemenides dynasty, and are, therefore, anterior to the Parthian and Sassanides dynasties.

In the small ædicula of Ferachbad, the Persian builders struck off on a bolder path, for the cupola, which is also borne on pendentives, no longer rests on more or less open-work walls, but on free pillars. The solution of the problem here approaches more nearly to that reached by Byzantine architects.

Among somewhat more recent structures, attention should

[1] M. Marcel Dieulafoy. "*L'Art Antique de la Perse.*"

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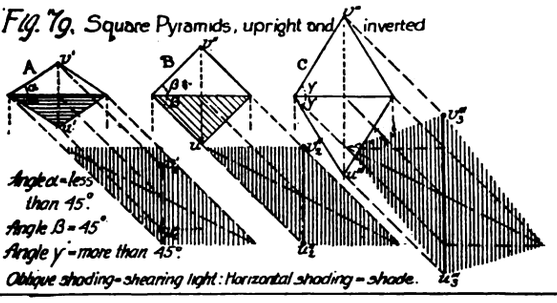
be given to the *atech-ga* of Djour, where the tower, which is encircled by a spiral inclined path or staircase, presents a striking resemblance to the ancient Assyrian temples, as well as to one of the oldest of Moslem edifices, the Mosque of Touloun; the latter has the same disposition. We may then consider the *atech-ga* of Djour as a sort of connecting link between the most remote epochs of Assyrian occupation and the modern days of Arab occupation.

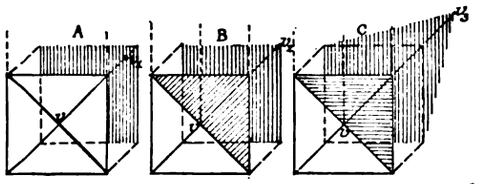
[To be continued.]

ARCHITECTURAL SHADES AND SHADOWS.[1] — IX.

CHAPTER VII — (*Continued.*)

Fig. 79. Square Pyramids, upright and inverted

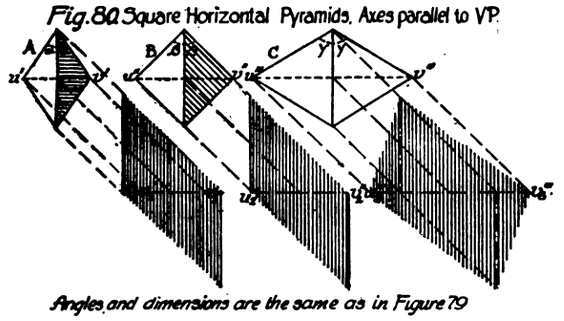




In plan these pyramids are supposed nearer the ground than they are shown to be in elevation.

102. AMONG pyramids the tetrahedron, or triangular pyramid, may be omitted from consideration, not being a form in common architectural use. *The square pyramid* generally appears in architecture with a principal square for its base, or, less frequently, a "lozenge." To the extreme points of the shadow of this base, found by Rule (II), (IV) or (VI), is joined by two right lines the shadow of the apex, completing the shadow of the pyramid, and showing its line of shade to be composed ordinarily of two sides of the base and two slant edges, the shadow being a quadrilateral. As the angle of inclination (the angle between the base and any side of the pyramid) diminishes, the shadow of the apex approaches that of the base until it falls upon its edge. This indicates that one side of the pyramid (if on a "lozenge" for its base) or two sides (if on a principal square) are in shearing light (Figures 81, *A*; 79, *B*; and 80, *B*). A further diminution of the angle, by bringing the shadow of the vertex wholly within that of the base, shows the whole slant surface

Fig. 80. Square Horizontal Pyramids. Axes parallel to VP.



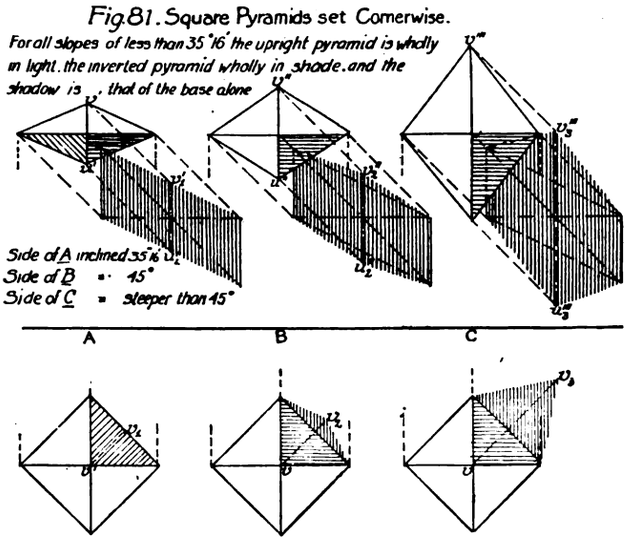
Angles and dimensions are the same as in Figure 79

of the pyramid to be in light, and only its base in shade; the shadow of the base is, therefore, the shadow of the whole pyramid (Figure 79, *A*), as is also the case when one or two sides of the pyramid are in shearing light. The angles at which the sides pass respectively into shearing light and into full light are indicated in the figures.

103. *The octagonal pyramid.* The varying phenomena of its shade and shadow are clearly indicated in the figures, the increase in the number of its sides, as compared with the square pyramid' affording a greater variety of cases of sides in shearing light. The octagonal pyramid chiefly occurs in the forms of turret-roofs and spires; that is, with a vertical axis, and the illustrations are, therefore, chiefly of vertical pyramids and their shadows on vertical and horizontal planes.

104. But the square and octagonal pyramid may alike occur in an inverted position, or with a horizontal axis parallel to *G L* or perpendicular to *V P*, as well as in various oblique positions. Dog-tooth ornaments and pyramid-flowers in Gothic and Norman decoration

Fig. 81. Square Pyramids set Cornerwise.

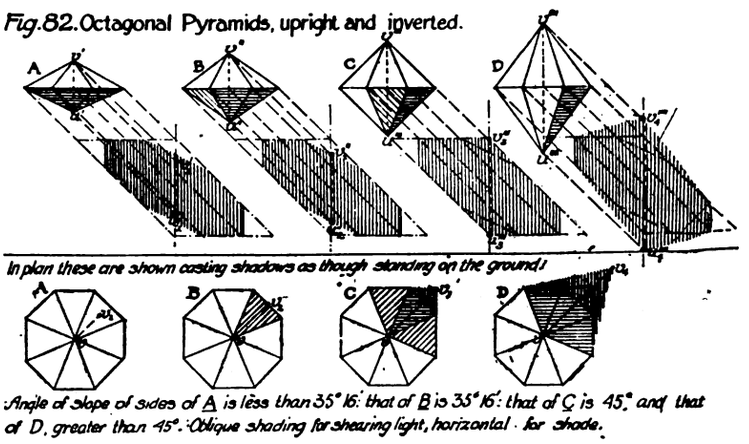

For all slopes of less than 35°16' the upright pyramid is wholly in light, the inverted pyramid wholly in shade, and the shadow is that of the base alone
Side of A inclined 35°16'
Side of B = 45°
Side of C = steeper than 45°
A
B
C

The shadows of these pyramids in plan are cast as though the pyramids stood on the ground. Oblique shading = shearing light; Horizontal shading = shade

are familiar instances of such occurrence of the square pyramid. It is not worth our while to particularize regarding them here. The special forms and relations of shade and shadow for the most important among them are indicated in Figures 79 to 82; it is only necessary to add a few words with reference to the axis and to the shaded sides.

105. The shadow of the axis is useful in locating the shadow of the apex. It passes through the centre of the shadow of the base, and, being (usually) the shadow of a principal line, is easily drawn by the rules for principal lines, and the shadow of the vertex or apex of the pyramid is located upon it. It will be seen from the figures that in the case of pyramids on principal squares *the shadow of the axis always passes through one corner of that of the base*,[2] and in the case of pyramids on "lozenges," through the middle of the long side, whether the shadow in plan or in elevation be considered. This fact makes it unnecessary to find the centre of the shadow of the base in order to draw the shadow of the axis.

Fig. 82. Octagonal Pyramids, upright and inverted.



Angle of slope of sides of A is less than 35°16'; that of B is 35°16'; that of C is 45°, and that of D, greater than 45°. Oblique shading for shearing light, horizontal for shade.

106. With regard to the shaded sides of the pyramid, the draughtsman should observe that *none of these is visible in elevation* when the pyramid has for its base a principal square, "lozenge" or octagon, and has its apex turned upward, to the left, or away from the eye; nor in plan when the apex points downward, forward or to the left.[3] In other positions, one or more dark sides come into view, according to their inclination to the base and their angular position, as is shown in Figures 79 to 83.

[1] By A. D. F. Hamlin, Assistant Professor of Architecture in the School of Mines, Columbia College. Continued from page 9, No. 745.

NOTE. — [In view of the inconvenience of having to refer to back-numbers for explanations of the notation used in these papers, the following memorandum will be found of service.]

H P = horizontal plane of projection; *V P* = vertical plane of projection; *G L* = ground-line or horizon. Capital letters designate points and lines in space, small italics their horizontal projections, and the same accented or "primed," their vertical projections. Subscript figures indicate points of shadow: small figures above the line indicate points of shade. Greek letters (α, β, γ, θ, δ,) designate angles. The *diagonal* of a line or dimension is its length multplied by $\sqrt{2}$. Shadows are indicated by vertical shading; shades by horizontal shading; shearing light by oblique shading parallel to the projections of the luminous ray.

[2] The shadow of the axis of a principal octagonal pyramid passes through a corner of the shadow of the square circumscribing the base.

[3] In those positions in which the apex is turned towards the light (*i. e.*, upwards, horizontally forward or to the left in principal pyramids), we may designate the pyramid as "upright" or "obverse." In the reverse of these positions it may be designated as "inverted."

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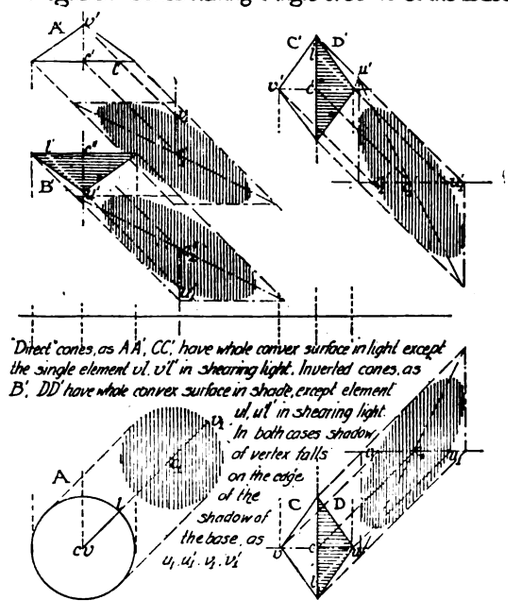
107. *The cone*, whose shadow, like that of the pyramid, is found by means of the shadow of the base and vertex, generally compels recourse to the reverse process for finding its line of shade. The discussion of the cone will be confined to principal cones, which may occupy any one of six positions, according as the vertex points towards the light; that is, upward, horizontally forward or to the left; or away from the light; that is, downward, horizontally towards *V'P* or to the left. In the first three positions we may call the cone *upright* or *obverse*, and *inverted* in the last three.

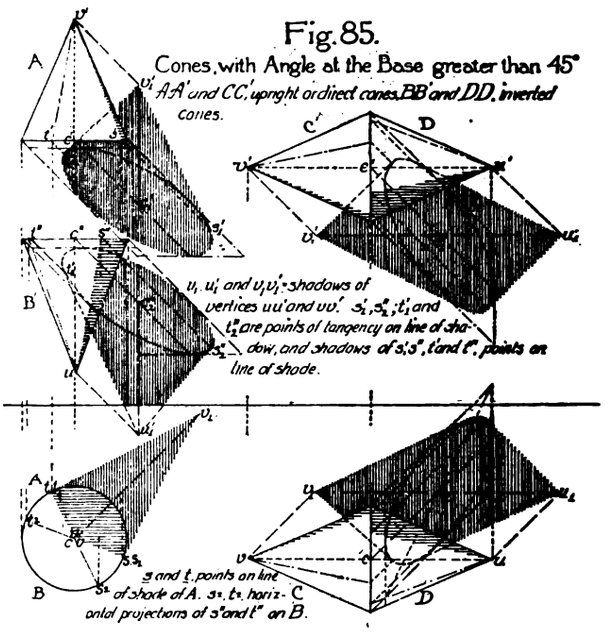
Fig. 83. Cones having Angle of 35° 16′ at the Base.


'Direct' cones, as AA', CC', have whole convex surface in light except the single element vl, v'l' in shearing light. Inverted cones, as B', DD' have whole convex surface in shade, except element ul, u'l' in shearing light. In both cases shadow of vertex falls on the edge of the shadow of the base, as u, u₁, v, v₁'

108. The line of shade of the cone consists generally of a portion of the circumference of the base and two right-line elements of the cone. Its shadow is, consequently, limited by an arc of a circle or ellipse, and two tangents to it meeting in the shadow of the vertex. The precise location upon the cone of the two right-line elements of the line of shade is found by following back the rays from the points of tangency on the shadow to the base of cone. The two points thus obtained are extremities of the rectilinear elements of shade. According as the vertex is higher or lower, its shadow falls at a greater or less distance beyond the shadow of the base. When the angle of inclination of the conical surface to the base is 35° 16′ (Figure 83), the shadow of the vertex glides along one element of the cone and falls on the edge of the shadow of the base. The whole conical surface, except that one element, is in light when the cone is upright or obverse (*A* and *C*, Figure 83), and in shade when the cone is inverted (*B* and *D*, same figure). At less than 35° 16′ the whole conical surface is in light or in shade, according as the cone is upright or inverted, while at 45° one-quarter of the conical surface of the upright cone is in shade, and three-quarters in the case of the inverted cone (Figure 84, *B* and *D*). Between 45° and 90° (at which angle the cone becomes a cylinder, with its line of shade on the corner) the front or visible element of shade on the upright cone must lie between the right-hand "corner" and the extreme right-hand element of the cone, and on the inverted cone between the right-hand "corner" and the middle of the cone. On the further side of the cone, the element of shade of the upright cone lies between the middle and the left-hand "corner," and, on the inverted cone, between the left-hand "corner" and extreme left-hand element of the cone (Figure 85). It should be observed that on the direct cone no shade is visible in elevation unless the inclination is steeper than 45°, and that half of the visible surface of the inverted cone of 45° appears in shade in elevation.

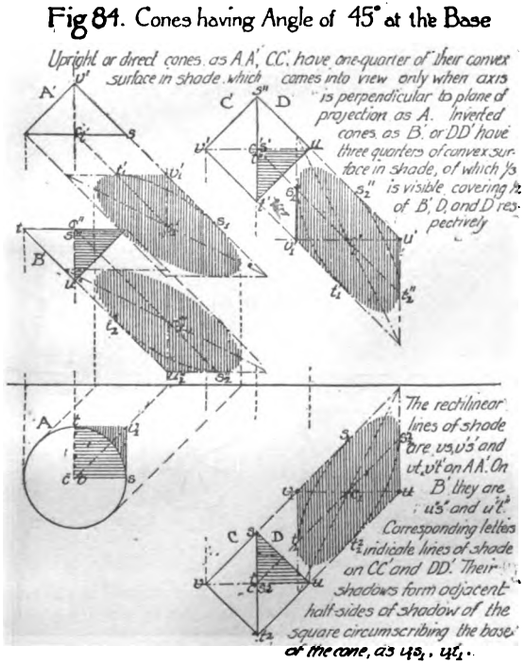
Fig. 85.

Cones, with Angle at the Base greater than 45°


AA' and CC', upright or direct cones. BB' and DD', inverted cones.
u, u₁ and v, v₁' shadows of vertices uu' and vv'. s₁, s₂'; t₁' and t₂' are points of tangency on line of shadow, and shadows of s, s', t and t', points on line of shade.
g and f, points on line of shade of A. s₁, t₂, horiz. projections of s' and t' on B.

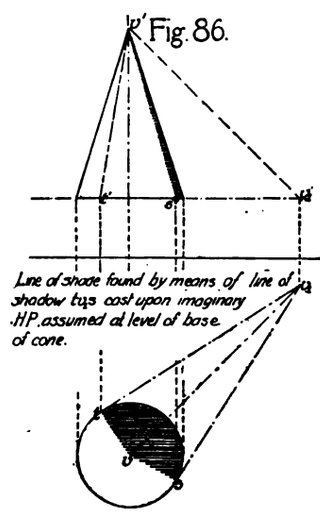
109. When the axis is perpendicular to the plane of projection and incidence (as in the plan of a vertical cone, or the elevation of a cone projecting horizontally from a vertical wall), the shadow of the base is a circle, and that of the vertex a point at a distance from the centre of this circle equal to the diagonal of the altitude or axis of the cone. Two tangents drawn from this point to the circle complete the outline of shadow. When the cone stands *on* the plane of incidence, its base covers its own shadow, so that we have only to draw from the shadow of the vertex two tangents to the base of the cone (Figures 83, 84, 85).

Fig. 84. Cones having Angle of 45° at the Base


Upright or direct cones, as AA', CC', have one-quarter of their convex surface in shade, which comes into view only when axis is perpendicular to plane of projection, as A. Inverted cones, as B' or DD', have three quarters of convex surface in shade, of which ¾ is visible, covering ½ of B, D, and D' respectively
The rectilinear lines of shade are v, v₁' and v', v₁ on AA'. On B' they are u, u₁' and u', u₁'. Corresponding letters indicate lines of shade on CC' and DD'. Their shadows form adjacent half-sides of shadow of the square circumscribing the base of the cone, as u, u₁, u', u₁'.

110. When it is required merely to find the line of shade on the surface of the cone, as in the elevation of a round spire or conical roof, a horizontal plane of incidence may be assumed passing through the base of the cone, or, indeed, cutting it at any desired level. The

Fig. 86.



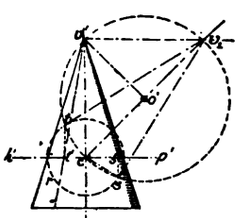


Fig. 87.

Line-shadow cast upon an H.P. assumed at level h'p', s₁t₁ being section at that level. The angle cs₁t₁, inscribed in semi-circle is 90°. g (and so f) is point of tangency; ∴ on line of shade, and g' is vertical projection.

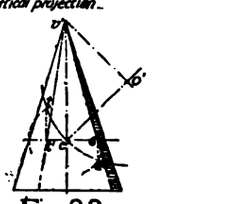


Fig. 88.

Abridged form of Method of Fig. 87.

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projection of the cone upon this plane will be a circle, to which we draw two tangents from the shadow of its vertex on the same plane, so that the points of contact of the two tangents are themselves the extremities of the two right-line elements of the line of shade. These two points are then easily found on the vertical projection of the base of the cone (Figure 86). But the two projections can be combined in one by drawing the circle or plan of the cone *on the elevation*, its centre being on the axis at the level of the assumed plane of incidence, as shown in Figure 87. The construction may be still further simplified if we remember that a tangent to a circle at any point is perpendicular to the radius drawn to that point; and that a right angle can always be inscribed in a semicircle, which, in the figure just referred to, would have for its centre the middle point *o'* of the shadow of the axis. This middle point may in turn be found by means of a line at 45° from the vertex of the cone to the shadow of the axis; and, as it is not necessary to draw the whole shadow of the axis, nor the two tangents (since all we are seeking to locate is the two points of tangency), we may reduce the whole operation to that described in the following rule:

(*XIII*) — *From any point, C, assumed on the axis as a centre, describe the circle of section of the cone at that level. From the same point, and from the vertex, draw two lines at* 45° *meeting in a right angle on the side away from the light in the case of the obverse cone, and on the side toward the light in the case of the inverted cone. From their intersection O as a centre, strike an indefinite circular arc through C; the intersections of this arc with the circle of section already drawn, when projected back onto the base of the cone assumed to pass through C, mark the extremities of the required elements of shade* (*Figures* 87 *and* 88).

[To be continued.]

SEARCH FOR TREASURE IN ABOUKIR BAY.

AN OLD STABLE
NEAR ROTHENBERG,
BAVARIA.

IN recent years many attempts have been made, some of which have been successful, to recover from the sea the treasures which have lain at the bottom of the ocean for many years. One of the most interesting of these enterprises is the attempt to raise from the sandy bottom of Aboukir Bay the treasure contained in some of the French vessels of war sunk by Lord Nelson at the battle of the Nile. The facts of that great naval engagement are historical and well-known. After the sacking of Malta, Napoleon attempted to enter Alexandria, but finding it difficult to do so, his fleet came to an anchor in the now historical Bay of Aboukir, and were there surprised by Nelson, and on that memorable night in August, 1798, the battle of the Nile put an end to Napoleon's ambitious aspirations in the East.

It is well-known that on his way to the East, Napoleon carried off from Malta treasures of great value. These treasures consisted of the loot of the Church of St. John's, and the whole of the specie and moneys deposited for safety in the French bank in that island. The Knights of St. John at that period were immensely wealthy, the income of the church exceeding £6,000,000 per annum. The greater portion, if not the whole, of this income was expended by the Knights in ornamenting their church, the plate, and even the candelabra and brackets being of precious metals, and the most beautiful workmanship, one candelabra alone, of solid gold, being large enough for twenty men to stand upon. These precious articles, including massive silver gates, were carried off by Napoleon, and taken by him on board his flagship "*L'Orient*." It is stated, and we believe authentically recorded, that on his way from Malta to Alexandria, Napoleon divided this treasure into three classes; the first consisting of specie and such articles of gold as could be easily melted and transformed into money for the payment of his troops; the second consisting of gold and silver ornaments, which might, if occasion required, also be used for the same purpose; and the third consisting of precious stones and articles of artistic beauty which Napoleon contemplated retaining for his own use. Some doubt has been expressed as to whether the whole of this treasure remained on board "*L'Orient*" on that memorable night in August, when the battle was fought. This doubt may apply to articles of the first class, inasmuch as it is believed some of the specie and articles of that class was sent ashore, and used for the payment of the troops in Egypt, but as to the second and third classes, there is every reason to believe they were on board and went down with "*L'Orient*."

It will be remembered that in the course of the battle, "*L'Orient*" was set on fire and exploded. Her magazines being in the centre of the vessel, she was literally blown in two halves. These two halves went down at a few cables length from the spot where the explosion took place. It is upon one or both of these portions of "*L'Orient*" that operations are at present in progress, for recovering the treasures we have mentioned. The divers employed in the enterprise have discovered the precise spot where the explosion occurred, and they have there found a huge heap of articles, which on the splitting asunder of the vessel appear to have rolled from her decks and cabins to the bottom of the bay. They are at present operating upon this wreckage, and upon one of the portions of the great ship, with a view to penetrating her store-rooms, and bringing to the surface the treasures which it is believed are still deposited there.

These operations commenced about the middle of June last, English divers, sent out by an English company formed for the purpose, assisted by Greek divers, carefully inspected and buoyed the position of the wreckage, and at the end of July a vessel with the necessary steam-lifting power and appliances commenced the work of raising these articles to the surface. Their operations have, however, been materially retarded by the phenomenally rough weather which has prevailed in the Mediterranean for the past two months. Heavy seas break into the Bay of Aboukir, and although it does not actually prevent the divers descending, yet it causes the waters to become so clouded, it is impossible for them to see to carry on their work successfully. Notwithstanding this drawback, however, they have, we are informed, up to the present brought to the surface a large number of valuable relics, consisting of swords, muskets, pistols, cannon, and articles of use and ornament, which were on board "*L'Orient*." They have found that this vessel was copper built, the huge bolts of copper, with which she was constructed, being twisted into every conceivable variety of shape by the force of the explosion. The value of the copper alone, which is of the purest metal (very superior to the class of copper used in the construction of vessels of the present day) and of great thickness, must be very great.

It has also been stated to us that centrifugal pumps for pumping out the sand arrived at the scene of operations a week or two ago, and have been fixed, and are now at work, and it is anticipated that on the subsidence of the present phenomenally bad weather, rapid progress will be made in this interesting search.

His Highness, the Khedive, his ministers, and, in fact, all classes of the community in Egypt take great interest in watching the progress of the work, and the scene of operations has been visited by His Highness and by several of his ministers. On August 3, His Highness inspected a number of the articles recovered.

It must be very satisfactory to the company engaged in these operations to find they have been so far successful as to have thus at the outset recovered more than sufficient to recoup them all the expenses of the expedition. We learn that it is possible that the rise of the Nile may for some two or three months cause a cessation of work, but the company are confident they will ultimately succeed in bringing to the surface all that remains of the great French vessel. In addition to "*L'Orient*" they also propose operating on the "*Maza Munda*," a large French transport, which carried funds and supplies to Napoleon, and before landing them was also sunk in the bay; the "*Juno*," another of the French ships of war, being also available for overhauling.

The work is an exceedingly interesting one, and we trust it may ultimately result in finding those treasures which it is firmly believed now lie at the bottom of the bay.

The French claim to have given up to them any articles, as they term it, of historic interest which may be brought to the surface. The right of the Egyptian Government to grant the concession for the recovery of the treasures is not disputed, but the French authorities say that, whilst admitting that the concessionaire is entitled to any treasures that may be recovered, articles of historic interest ought and must be given up to them. What are articles of historic interest they do not define. What, however, it is believed the French Government do, and will claim, are papers and letters which it is anticipated will be found in a state of preservation, and which may possibly disclose matters of French history as affecting Napoleon and his movements at that day.

The Egyptian Government at Cairo, without admitting the French claim, have in compliance with their requirements, appointed His Excellency, Middlemas Bey, to watch the operations of the company, and the company has given him every facility for the performance of his duties, and we learn that His Excellency has expressed himself perfectly satisfied with all that has been done up to the present. — *Invention.*

A BUST BY G. DUPRE. — The Louvre was not long ago enriched by the addition of a bust by Guillaume Dupré, who, in the seventeenth century, gained fame by his medallions. It was believed that he confined himself to work in relief, and the bust is the only known example of his skill in the round. The subject, De Vic, was a governor of Calais, and vice-admiral of France, and he is represented wearing a cuirass with a mantle thrown over the left shoulder. According to the *Courrier de l'Art*, the bust belonged to a lady who was offered 30,000 francs for it by an amateur. But, preferring that the work should be in a French gallery, she began negotiations with the government, and finally sold it for 18,000 francs. This is patriotism of a certain sort. — *Commercial Advertiser.*

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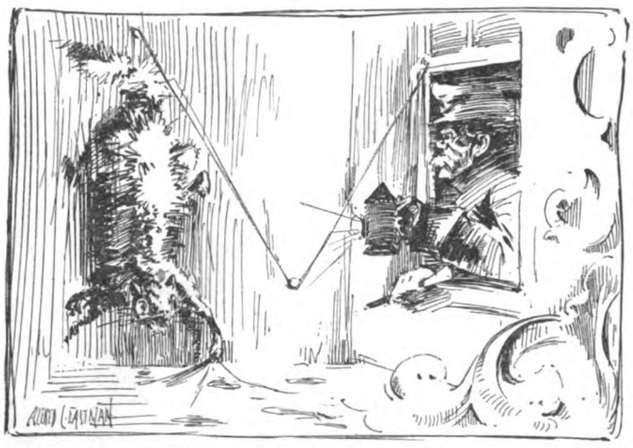
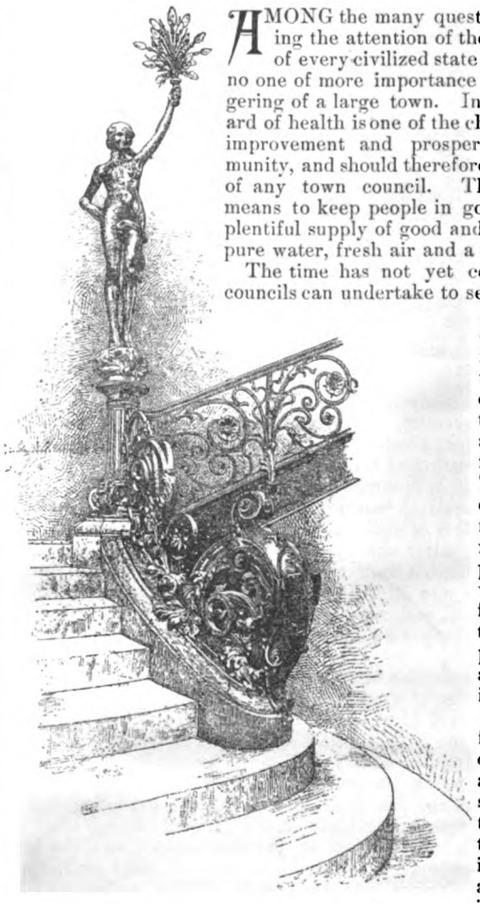
MR. WILLIAM MORRIS ON GOTHIC ARCHITECTURE.



"All the Modern Improvements."—No. 8.

MR. WILLIAM MORRIS lectured on Saturday afternoon at the Artists Club, Liverpool, on the subject of "Gothic Architecture." The lecturer said that the word architecture was commonly understood to mean the art of ornamental building, and in that sense he should often have to use it in his lecture. Gothic architecture is, he observed, the most completely organic form of the art which the world has seen. The break in the thread of tradition could only occur there; all the former developments tended thither, and to ignore this fact and attempt to catch up the thread before that point was reached would be a mere piece of artificiality betokening not a new birth, but a corruption into mere whim of the ancient traditions. In order to illustrate this position, the lecturer sketched the historical sequence of events which led to Gothic architecture and its fall. East and West it overran the world wherever men built with history behind them. In the East it mingled with the traditions of the native populations, especially those of Persia of the Sassanian period, and produced the whole body of what we erroneously call Arab art (for the Arabs never had any art), from Ispahan to Grañada. In the West it settled itself in the parts of Italy that Justinian had conquered, notably Ravenna, and thence came to Venice. From Italy, or perhaps even from Byzantium itself, it was carried into Germany and pre-Norman England, touching even Ireland and Scandinavia. Rome adopted it, and sent it another route through the South of France, where it fell under the influence of provincial Roman architecture, and produced a very strong, orderly and logical sub-style, just what one imagines the ancient Romans might have evolved if they had been able to resist the conquered Greeks that took them captive. Then it spread all over France—the first development of the architecture of the most architectural people—and, in the north of that country, fell under the influence of the Scandinavian and Teutonic tribes, and produced the last of the round-arched Gothic styles we call Norman, which those energetic warriors carried into Sicily, where it blended with the Saracenic Byzantine, and produced lovely works. But we know it best in our own country, for Duke William's intrusive monks used it everywhere, and it drove out the native English style derived from Byzantium through Germany. It was the first style since the invention of the arch that did due honor to it, and instead of concealing, decorated it in a logical manner. It had shaken off the fetters of Greek superstition and aristocracy, and Roman pedantry, and though it must needs have had laws to be a style at all, it followed them of free will and unconsciously. The cant of the beauty of simplicity—viz., bareness and barrenness—did not affect it. It was not ashamed of redundancy of material, or superabundance of ornament, any more than nature is. Material was not its master, but its servant. Marble was not necessary to its beauty. Stone would do or brick or timber. Smoothness it loves, and the utmost finish that the hand can give; but, if material skill fail, the rougher work can so be wrought that it also shall please us with its inventive suggestion. During the twelfth and thirteenth centuries, as far back as the art of beautiful building is concerned, France and England were the architectural countries *par excellence*. The period in which Gothic architecture reached its zenith was marked by the Battle of Courtray, where the chivalry of France turned their backs in flight before the Flemish weavers. All over the intelligent world was spread this bright, glittering, joyous art, which had now reached its acme of elegance and beauty. Dante, Chaucer, Petrarch, the German hero ballad epics, the French romances, the English forest ballads, the Icelandic Sagas, Froissart, and the chroniclers represent its literature. Its painting embraces a host of names of Italy and Flanders chiefly, the two great realists, Giotto and Van Eyk, at their head. The few pieces of household goods left of its wreckage are marvels of beauty; its woven cloths and embroideries are worthy of its loveliest building. In the middle of the fourteenth century Europe was scourged by that mysterious terror, the Black Death, and in the years that followed it Gothic architecture began to alter its character. It began to lose its exaltation of style, and to suffer a diminution in the generous wealth of beauty which it gave us in its heyday. In England it grew more crabbed and even commonplace. In France it lost order, virility, and purity of line. At last, at the close of the fifteenth century, the great change became obvious. This change we have boastfully, and as regards the arts, called, "The New Birth." In short, the age of commercialism was being born. There are many artists at present who do not sufficiently estimate the enormity, the portentousness of this change, and how closely it is connected with the Victorian architecture of the brick box and the slate lid, which help to make us the dullards that we are. St. Peter's in Rome, St. Paul's in London, were not built to be beautiful and convenient. They were not built to be houses of the citizens in their moments of exaltation, their supreme grief or hope, but to be proper and respectable, and therefore to show the due amount of cultivation and knowledge of the only people and times that in the minds of these ignorant builders were not barbaric. From this brief historic review of the progress of the arts it results that to-day there is only one style of architecture on which it is possible to found a true living art which is free to adapt itself to the varying conditions of social life, climate, and so forth, and that style is Gothic. What we now call architecture is but an imitation of an imitation of an imitation, the result of a tradition of dull respectability or of foolish whims without root or growth in them. It is true that the world is uglier now than it was fifty years ago; but then people thought that ugliness was a desirable thing, and regarded it as a sign of civilization, which no doubt it is. Art cannot be dead so long as we feel the lack of it. Unhappy and slavish work must come to an end. In that day we shall take Gothic architecture by the hand, and know it for what it was and what it is. —*The Building News.*

THE SANITARY SERVICE OF AMSTERDAM.[1]



Staircase of Machinery Hall, Paris. From *L'Architecture.*

AMONG the many questions now engaging the attention of the scientific public of every civilized state there is certainly no one of more importance than the scavengering of a large town. Indeed, the standard of health is one of the chief factors in the improvement and prosperity of the community, and should therefore be the first care of any town council. The most certain means to keep people in good health are a plentiful supply of good and wholesome food, pure water, fresh air and a disinfected soil.

The time has not yet come when town councils can undertake to see that every citizen has an abundant supply of food, but they can watch over the quality and see that no adulterated food be offered for sale. The inhabitants of Amsterdam may, as a rule, rejoice in the possession of pure water. In how far, then, is attention given to the purity of the air and the disinfecting of the soil.

To obtain fresh air and a disinfected soil, a town must possess a good system of drainage, that is, one which is quick, regular, and perfect in its escape, and all animal matter of which 95 per cent of the refuse of a town consists and which in a rotting state throws off those dangerous gases which infect the soil, must be perfectly disinfected. Yet this refuse is only refuse in a town when heaped up in cess-pools, gullies, and drains. On the other hand, it becomes a blessing when taken to the right place, namely, the fields. This, in fact, is the only proper means to entirely disinfect a town.

According to scientific inquiry, the excreta of every person, irrespective of age, averages 286 kilograms a year, seven-eighths of which is in a fluid state and about one-eighth solid, excellently suited for manuring purposes, and worth from 2 to 2.40 florins. The collective value of the human excreta of the population of Amsterdam represents, therefore, in theory, a sum of not less than 800,000 florins.

[1] Translation, by Consul Eckstein, of an article published in Amsterdam, on the City Sanitary Service.

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Now, Amsterdam possesses, at present, two systems by which part of its drainage is done. The first is the flush system, by means of which all impurities, both solid and fluid, with the exception of ashes, kitchen refuse, and street sweepings, run waste through brick drains into the canals. The other system, on the contrary, separates the refuse in such a way that only the rain and slop water flows through the drain, whilst the excreta is collected in a solid, unmixed form and sold to the agriculturist at a high price. This latter system is subdivided into the Liernur system and the exchange-tub system.

There is still another way of collecting fæces, which is unworthy the name of system. We refer to the cess-pools. These are still found in many houses. Hereafter we shall explain how the fæces are got out of these cess-pools. At present all excreta, except that which runs through the drains into the canals, the effects of which one becomes strongly sensible of by taking a walk along the Rose and Eglantine canals, all the ashes, kitchen refuse, street sweepings, etc., are conveyed to the extensive grounds lying in the Polder of Sloten on the Kostverloven Wetering, and commonly known as the Belt. They reach these grounds either through the net system of Liernur or by means of boats and dust carts.

The inventor of the system, Captain Liernur, set to work on the idea that the flushing by water, leaving out of account its effects on health, caused a loss of millions and millions to the farmer, and he concluded that compressed air might be employed. This has the advantage of being everywhere present, and it diminishes nothing from the volume or weight of the matter. Let us briefly describe this system, as worked in Amsterdam, with some unimportant alterations: The excreta fall along the privy-pan into a funnel, which is so arranged that the matter drops directly into a turned-up S-bend fastened to a stand-pipe; in the funnel is a grate to prevent any large solid matter from entering the pipe. This funnel is moreover connected by a pipe with the outer air so that offensive gases are carried off. Near the funnel there is a lid over the S-bend, which can be screwed off for inspection and the removal of any obstacle in case of stoppage.

The different stories of a house are all connected with the same stand-pipe, which is extended above the roof-level to obtain the necessary air-pressure. At the bottom there is again a siphon, to which a distention valve is fixed, to carry off the gases which accumulate in the soil-pipe; this valve turns the gases into another pipe, which also extends above the roof. As a rule, this second pipe is coupled onto the first in the attic. The siphon is also furnished with a lid, which can be taken off to remove any obstruction. The stand-pipe runs out into the middle of the street, where it can empty itself into a small reservoir, which can be shut off by a valve. The object of this is, in case of obstruction in any stand-pipe, to be able to shut off all the other stand-pipes and turn the full volume of air on this one, which is alone connected with the vacuum.

From the small reservoir runs a side escape, which empties all the privies at once into the main, this being connected with the street reservoirs by means of turncocks. Every block of buildings, therefore, must have a side escape into the main.

Several escapes empty themselves into the street reservoir, generally about six or eight; these reservoirs being mostly situated at cross streets. From the pumping-station at the Kostverloven Wetering there run two chief mains, the one serving for the pneumatic working and the other for the conveyance of the soil through all the parts of the town where the Liernur system is completed. The street reservoirs are connected by taps with these chief mains.

At the central pumping-station a steam air-pumping engine of 60 horse-power exhausts the large reservoir. The chief mains being connected herewith by the opening and shutting of taps, the air volume therein gradually diminishes, and this again reacts on the street reservoirs. Thus the air is exhausted from reservoir to reservoir. If, now, the tap of the escape-pipe from the buildings to the street reservoir be opened, then the vacuum extends itself once more to the excreta in the S-bend. From above there is a volume of air pressing downwards, which in its course carries everything with it and empties the same into the street reservoir. When this is full, the taps of the chief air-main are turned off and the tap of the chief conveyance-main opened, which has also been exhausted. Above the reservoir is a valve, and this being opened the outer air presses on the soil and drives it into the chief conveyance-main, and as the engine continues to exhaust the air the soil speeds along to the large reservoir at the pumping-station. The speed would become something enormous if the mains were quite horizontal; but, as they sometimes rise and fall, this serves to moderate the speed. At the pumping-station the soil is received in two lower reservoirs. An arrangement brought into action by the pumping-engine alternately opens and shuts the taps, so that automatically, as soon as one reservoir is filled its taps are closed and the taps of the next one opened for the reception of the matter. In the same automatic way the matter is brought up into the two upper reservoirs, whence it flows off to the different quarters where it is required.

The gases which are drawn off from the chief main are burnt in fires under the boilers. At the end of 1888 the number of blocks of buildings connected with Liernur's system was 2,847, and these blocks were inhabited by 50,240 persons. The quantity of soil amounted to 44,840,150 litres.[1] To the Belt Liernur-fæces are also brought from the temporary arrangement by boats. This is the so-called tub system with drop pipes. The fixing of the stand-pipe and the tunnels attached is just the same as in the other system, only the soil in this case runs into small reservoirs capable of containing from 200 to 300 litres, situated in front of the house, whence it is pumped by an air-pump into tanks and conveyed by boat to the Belt. Last year 35,121,500 litres were collected in this way. The exchange-tub system is distinguished by its simplicity. It is in working in 334 blocks of buildings, and requires 1,505 sets of tubs, which are daily carried from the houses in well-closed carts and conveyed to the Belt, where, in a special building, they are emptied, cleansed, and disinfected. The average number of tubs exchanged every day is 810, and the quantity of soil collected in this way amounted last year to 1,500,000 litres. The original intention was to turn the matter collected by the Liernur system and the exchange-tub system into "poudrette," and a "triple-effect" was set up for this purpose. To carry out this, however, it is necessary to allow the matter to thicken into a paste, and, as this did not succeed, the plan had to be given up. At present, tests are being made to turn the fæces into sulphuretted ammoniac, which so far have been very successful. If the Liernur-fæces cannot be worked up artificially, they are taken to the compost sheds (to be described hereafter), the reservoir of fæces, or to the boats for conveyance to the country.

Now, what do we find at the central Belt? (1) Liernur-fæces collected by the air-pumps; (2) Liernur-fæces brought in by boat; (3) fæces from the exchange-tubs. But this is not all. The cess-pool carts which patrol the back quarters of the town, and into which the fæces are poured in a most unsightly manner from all sorts of vessels, brought in 7,277,000 litres in the year 1888. And now comes the residuum of the night work. In 1888 there were emptied 871 privies with the Latrine cleansing machine, and in 83 cases it was necessary to carry the soil in buckets by hand, which produced 10,651,000 litres. Such a machine empties a privy without smell. A thick hose is so placed in the cess-pool as to have its termination below the matter. This hose is then fastened to an iron cylinder or a large, air-tight barrel capable of containing 1,500 litres. By means of an air-pump the cylinder is exhausted and the matter flows pneumatically into the barrel. A gutta-percha ball shuts off the connection as soon as the barrel is full. The gases are drawn off from the pipe and burnt in a fire attached to the pump, so that there is no smell. One night we convinced ourselves of the excellent qualities of this machine, which, being worked by hand, causes no noise. Some means must be found to dispose of this immense mass of fæces consisting of nearly 100,000,000 litres, or 100,000 cubic metres. As we have said before, part of it is turned into sulphuretted ammoniac, and another part is taken off by boats, consequently we need not be concerned on this head.

In the meantime the dust carts in their daily rounds collect an immense mass of ashes and refuse at every house and in every street. Large quantities of refuse and street sweepings and floating matter from the canals are brought in by boat — in 1888, *inter alia*, 4,535 carrions. The abattoir sends also its offal. All this material is sorted at the Belt, and objects of any value set aside, such as rags, paper, iron, glass, etc., and then the rest is taken to the compost sheds, where it is flooded with the Liernur-fæces, and so the compost manure is made.

The street sweepings and flotsam of the canals, which are not used in the compost sheds, after being assorted and dried, are sold in trade and bring a good price. What still remains of the fæces is put into a large brick reservoir 65 metres long by 25 metres broad and 4 metres deep, whence it is sold for manuring of fields and sandy soil. The market-gardeners are the largest buyers, this article being specially useful in the cultivation of cauliflower. In 1888 the total receipts for manures of all kinds was $55,840.

The premises of the central Belt are entirely surrounded by water, which greatly facilitates the loading and unloading of boats, whilst the grounds are also rendered easily accessible to the dust carts. A branch line connecting these premises with the Dutch Railroad is still a pious wish.

If one pays a visit to the Belt in the morning, one sees a continual streaming in and out of carts and boats, which deposit their various loads here. The quantity of ashes and refuse brought-in in 1888 amounted to 25,860 cart-loads, 2,813 barrow-loads, and 9,470 boat-loads, making a total of 117,363 cubic metres.

There is scarcely an institution of any importance which does not possess its cabinet of curiosities, and the Belt has also its cabinet. South of the pumping-station proper, on the other side of the canal which surrounds the premises, there is, besides the town disinfecting rooms, a large oblong shed for storing objects found among the ashes and refuse. Here we may learn that the most unsightly-looking objects and bits of paper have their comparative value.

From the nature of the refuse collected at every door the variety of things to be found herein is considerable. Here, in the first place what we commonly denominate refuse is classified, linen and cotton rags taking the foremost rank. These are first put through the mill, which cleanses them from all dust, then washed and dried and packed in bales. The paper manufacturers know their value. But even rags are sorted once more. We find the linen, the cotton, the muslin and woollen departments.

Above all, the carpet department attracts attention. The Smyrnas, Doorniks, Brussels, and Deventer carpets are all neatly arranged, and their value is not inconsiderable. Nay, even amongst the rags their distinction is kept up. The proud Smyrna would never be associated with a piece of stair-carpet or cocoa matting.

[1] 1 litre = 2.113 pints.

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Broken glass has here also an important place. And, strange as it may seem for a city like this, where last winter hundreds of people were daily supplied with a loaf of bread gratis, there is a large tank full of pieces of bread ranging from the finest sorts down to the black bread. This can, however, be turned into fodder for the cattle. Shoes are by no means wanting; there are bales and bales of old shoes and boots in the warehouse which will find a buyer. In fact, we have been told that the beautiful leather articles of Vienna and the cuir de Russe are manufactured from old boots, which are ground to powder and pressed. Many of the beautiful-looking albums we see are made in this way.

There are bales of old and new tin articles, hundreds of tins and metal objects, such as tea-pots, coffee-cans, spoons, forks, etc., heaps of cotton-down, horse-hair, and such like; all lie assorted just as neatly as we find objects in a fashionable shop in the Kalverstraat. Twice a year these things are put up at auction. These premises are during the whole day an everchanging scene of life and movement. The carts drive in and out, the boats come and go, and the five and twenty tjalks are loading or awaiting their turn.

As a matter of course, the cartage and working of so many thousand cubic metres of material, and the sweeping of the streets, squares and canals, require a large number of work people. In addition to the inspectors, about three hundred workmen are employed. For collecting the ashes and refuse there are 12 commanders, 52 foremen, 52 assistants, 35 barge-men, 2 masters for the tug-boats, 2 engine drivers, and 65 horses. Further, 10 men are engaged in collecting the flotsam from the canals. For sweeping the streets there are 6 commanders, 12 drivers for the sweeping-machines, 70 workmen, 6 drivers for the water-carts, and 20 horses. To water the streets in the height of summer 30 workmen and 6 horses are required. Seventy-nine workmen are necessary to look after the drains. At the Belt itself there are 2 bosses, 2 commanders, 107 workmen, 1 engine-driver, 1 cooper, etc.

The plant and 115 horses required for the sweeping-machines, exchange-tubs, Latrine carts, refuse carts, etc., are stationed on the Bilderdijkkade, generally known as the central stables.

This depot is also well worthy of a visit. The premises are surrounded by palisades, flanked by the dwellings of the two bosses, and the whole plant, such as sweeping-machines, exchange-tub carts, arranged under awnings which are made fast to the walls of the stables. This is probably done for economy's sake, but it does not appear to me sufficent protection against wind and weather.

On the left are the sheds, a smithy, a cartwright's shop, the painter's, the cooper's, and the saddler's shops, and the warehouse of all sorts of articles necessary for repairs or the replacing of the materials in use. The wages paid to the workmen in these shops amounts to $3,734.

The stables, however, are the most interesting of all. They are built in three long rows, and between them the space intervening is fitted up for cart sheds. Each stable has room for forty horses, allowing 1.7 metres of standing room for each horse. There is none too much room as these horses are chosen for their size and draught powers. Among them are some really fine-looking animals, giants we may call them in their domain.

For these stables there are two bosses, assisted by an upper groom and six stablemen.

The largest and strongest horses are employed for the sweeping-machines, and it is an interesting sight to see the machines drawn by these gigantic horses at 12 o'clock at night file out through the gates to commence their work in the different quarters of the town.

As a rule, there are twelve horses, twelve drivers, twelve machines, sixty-six sweepers, and from twelve to fifteen barrows engaged in this service every night. In dry weather the sweeping-machines are preceded by the water-carts. The sweepings are wheeled in barrows to the side of the canals, shot into boats, and conveyed, early in the morning, to the Belt. In this way all the streets get a thorough cleansing once a week, and the principal streets and squares three times a week.

The drawing of the sweeping-machines is very heavy work; it requires the strongest horses, and these are very soon unfit for this service. The stables are excellently well kept, and are specially remarkable for their cleanliness and airiness. On these premises there is also a shoeing smithy, a horse pond, and a coach-house and carriages for the service, beside a hospital stable for the horses. At present the latter is, fortunately, unoccupied, and it struck us as being small, for there is only room for three horses.

On these premises there is standing-room for two hundred and fifty carts, and, with the fodder and other requisites, the expenses are not small. In the estimates 40 cents a day are set down for the maintenance of each horse. For 1890 the sum of 21,648 florins has been put into the estimates for the purchase of new horses, fodder, shoeing, saddlery, etc., and for the maintenance of the rolling stock 4,260 florins. The average price paid for a horse is 204 florins. In 1888 there were required 238,710 kilograms of hay, 318,280 kilograms of oats, 173,805 kilograms of straw, or for each horse per day, 6 kilograms of hay, 8 kilograms of oats, and 4.4 kilograms of straw; and the total expenses for forage and bedding came to just over 41 cents per horse per day.[1]

The work of cleaning the streets is heaviest after a fall of snow. Then snow-plows are used. To clear away the snow from the bridges salts of potash are used with good effect. At such times men, horses, and material are all put to the strain, and often some hundreds of men are called in to assist temporarily. In warm weather the streets have to be watered by the hose from the fire plugs or by the water-carts. At all times the kennels and drains must be looked after, the cess-pools, large and small, deepened, and the urinals kept clean, and all the refuse sent on to the Belt. This item in the expenses is set down at 20,000 florins. There are in Amsterdam 3,567 large cess-pools and 7,495 smaller ones; the number of urinals is 237. These are cleansed once every day, flushed and painted over with a mixture of carbolic acid and black varnish. The town is divided into six divisions, which are again subdivided into sections, so that each dust cart and each boat has its appointed work to do. For each division there is a responsible superintendent.

Though it appears we are still far from perfect, yet we are on the right track to gradually carry out the most urgent demands of sanitation. People who knew Amsterdan ten or fifteen years ago readily confess that rapid progress has been made; and if this service demands an estimate of 218,480 florins for 1890, who will say this amount is too much to pay for pure air and a disinfected soil?

The Liernur system is certainly the system of the future, and this question will no longer present any difficulties when Amsterdam gets its net completed. Then the difficulty will arise, how to get rid of the immense mass of fæces which will be accumulated. Perhaps then the Heath Company will become a large buyer, and the refuse of Amsterdam will be conveyed to the heaths of Guelderland and North Brabant; there it will not be refuse, but gold.

[1] The florin = 40.2 cents American, so that the 41 cents here referred to doubtless mean Dutch cents, 2½ of which equal 1 American cent.

ARCHITECTURAL EDUCATION IN ITALY.

THE question of architectural studies in Italy is one which dates a long time back, and which in these days has been brought forward again. It is curious that in Italy we have no schools of architecture; that is to say, we have no architects recognized as such by the State. We have engineer architects with diplomas and a superficial instruction in the architectonic art, and we have architects without diplomas who have not had, officially at least, any instruction in the practice of building. I will explain whence comes this strange condition of architectural studies in Italy. In Italy there are two institutes to which are admitted those who desire to study architecture, the polytechnic schools and the academies of fine arts. Evidently architects ought not to be merely artists, but also men practiced in the knowledge of construction, as well as instructed in history and the archæology of their art, especially where there is a glorious past to preserve, and study of the antiquity and the restoration of monuments are pushed to extremes. So that we have to solve the question in Italy by making our architects engineer architects; that is to say, architect constructors (as if architects not constructors could logically exist), and the necessity is recognized of giving a scientific and artistic education at the same time to the young men who desire to practice architecture, sharing their education between the polytechnic schools and the academies of fine arts. It must be known first that the people of the polytechnic schools come from two institutes very different in their aims, both of them being secondary institutes of general culture: from the "Lycées," schools almost entirely literary, and from the technical institutes, schools almost wholly scientific. In the Lycées the pupils follow courses in literature, Greek and Latin, philosophy, history, chemistry, physics and elementary mathematics, or continue a course of drawing which these pupils have already followed in the Gymnase, where the instruction in drawing is quite ludicrous. In the technical institute the pupils follow courses of mathematics, chemistry, history, and a course in ornamental and mechanical drawing, but with an aim quite outside of any artistic purpose (I speak of the

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physico-mathematical section). In this way then the pupils of these secondary institutes follow their theoretical courses at the university for two years, or better, their five years at the polytechnic, where the instruction is divided into two preparatory and special courses in this way.

Behold, then, these young people, especially those from the Lycées, who have never drawn anything unless hastily in their two years' preparation in the architecture course of the polytechnic; behold them in the school of architecture almost without artistic preparation, and in three years they will be architects in virtue of a diploma which the State will award them. I have picked out the school of architecture of the polytechnic, but in truth I ought to speak of the academies of fine arts. If the pupils of the architectural section of the Italian polytechnics must follow the artistic courses of the institutes of fine arts, it must be known that the courses of architecture for the polytechnic students have, that is, a duration of three years, and acknowledge the study of architectural styles considered in their historical development, the study of composition and modelling in clay the ornaments of architecture, the interior decoration of buildings, the drawing of perspectives, and exercises in water-color, as well as the study of architectural æsthetics. During the course the pupils must exercise themselves in the measurement of monuments.

This programme, as you see, is sufficiently large and practical, but in the case of the polytechnic pupils who follow architecture, they do not find themselves in the way of deriving much benefit, because of their lack of preparation. In the school of architecture to which is attached the study of ornaments, of the figure, of modelling, the new polytechnic students do not find themselves at their ease. In revenge *ils sont des deplaces.* Although the scientific courses which these polytechnic students must follow in the same way as the industrial and civil engineers are less serious, yet it is not less the truth that these pupils have not time enough to acquire a reasonable amount of instruction in the arts. Three years would perhaps be enough for pupils directed from the very beginning of their studies to artistic subjects, but for young people who have merely a general culture, three years are absolutely insufficient to equip one for the profession of architecture. Add to this the fact that these three years of instruction in our polytechnic schools are never followed by pupils with regularity and diligence, and you will have a perfect image of the condition of the pupils in architecture in the Italian polytechnic schools. The polytechnic students that I find in the schools of architecture, without rational preparation, after enrolling themselves in the artistic courses usually feel that they have no need to consider other obligations. Their names are absent in the schools of ornament and modelling; yet civil architects, as they are called in their diploma, are well-trained men in science applied to construction, but not at all so in the architectonic art and decoration. You will ask how is it that they do not oblige these polytechnic students to present themselves regularly at the courses of the academy and the examinations. We can oblige the polytechnic students to follow the artistic courses, but experience has shown that these pupils are often rather mediocre architects. For them art comes to the aid of science; it is not science which aids art, as, according to my understanding of an architect, should be the case. However, in the Italian polytechnics the section of architecture is that which gives the least useful results. The Italian polytechnics are scientific schools, for industrial engineers and builders of bridges and ditches. For example, at Milan there is a noted polytechnic school. The polytechnists call the school of architecture the "hospital," as much as to say, that it is a school of the broken down and hopeless.

Since 1865, the year when the section of architecture was attached to the Polytechnic at Milan, from 1865 to 1888, the architects who have there received their diploma are only thirty-two in number — thirty-two architects in the course of twenty-three years. This is ridiculous, and of these thirty-two architects how many are there who have any artistic capacity? I don't say a very remarkable capacity. I assure you that the right hand will be more than sufficient to count them. Neither the polytechnics nor the schools of application at Turin, Rome, Bologna or at Naples, give better results than those which I have pointed out as attaching to the school at Milan.

And then, you will ask, Italy being without architects, who is it that builds the houses and erects public monuments? I said a little while back, those who desire to practice architecture in Italy graduate from two institutions and schools of application, the polytechnics or institutes of fine arts. Now let us see what these architects are, or the so-called architects, who graduate from the institutes of fine arts. It is necessary to understand these gentry from the beginning of their education, for it is especially to these academic students that I desire to draw your attention. The pupils who attend the artistic courses at the institutes of fine arts can enroll themselves at the academy schools at the age of twelve years. These young academicians commence their artistic career with a very elementary education, quite fitted, for the matter of that, to their age. They are entered into a preparatory course, which lasts a year, for the elementary studies of geometry and geometrical and ornamental drawing. The preparatory course finished, these youths begin the so called common course, which lasts three years, and which aims at a general education in descriptive geometry, studies of shades and shadows, perspective, the elements of architecture and ornamentation, the figure, the elements of anatomy, the history of art and Italian history. At the end of this instruction each pupil must select his special section to which he desires to be admitted. If it is the section of architecture, the pupil must arrange to follow the course for four years, quite after the fashion of the polytechnic architectural students, except as to the fourth year, which is obligatory on the academical students, but not for the polytechnic students. The instruction of the academic student and of the polytechnic being in common, the programme of instruction is the same for one as for the other; the difference is that the polytechnic pupils, having attended the instruction in science applied to construction receive the diploma of civil architects, while the academic students, without any scientific preparation, and with an instruction almost exclusively artistic, have at the end of their course an humble license, a license of a professor of architectural drawing. Of what use this is I cannot imagine.

I have shown you, then, that we have in Italy polytechnic architects, who to be real architects have insufficiently studied architecture, and professors of architectural drawing, or as they are called, academic architects, who have no necessary cultivation in technical matters to be able to follow the profession of architect with ability. So that in spite of the diplomas awarded by the State, Italy has no architects, that is to say, it has not in its schools a sufficient cultivation to produce them. Yet in practice polytechnists and academicians practice architecture after their manner, and to tell the truth I ought to tell you at once that in Italy we have in these last years some remarkable constructions. We owe almost all these constructions to architects educated in the academies, to these humble professors of architectural drawing, or to those who, not even being professors, have attended the artistic courses of the academies *temporibus illis.* Finally all, or almost all, Italian architects who have any reputation with us are academicians, who, even so far as numbers go, are much fewer in number than the polytechnic architects, and are not recognized by the State except as professors of drawing. The situation is sufficiently odd. It is for this reason that the question of giving a more rational organization of the study of architecture in Italy has been agitated many times, and congresses of architects and engineers have been frequently agitated in the press, and to-day once more brought upon the carpet by our rulers, who are solicitious of securing the support of several deputies to Parliament. The architect academicians, although some amongst them aim to teach themselves on those points where their deficiency is marked, in fact fail in technical knowledge; but on the other hand, they have a very remarkable artistic education. For this reason, it is said, let us endeavor to complete this instruction, and, the architect being an artist, science comes to aid him, and art does not come to the aid of science, as they have attempted to bring about in polytechnic courses. In fact with the aim of succeeding once in reorganizing the instruction of architects, in 1885 a decree of the Minister of Public Instruction, M. Coppino, established three "complete" schools of architecture by way of experiment, three schools after the kind of that at Paris for diploma architects, in the institutes of fine arts at Florence, at Rome and at Naples. The programmes of these schools divided the courses into two parts, the inferior and superior course, and the latter was for technical license. Mark this. This license is inferior to that of the technical institutes. The inferior course of three years consisted of a general and elementary instruction in history and the arts, in mathematics, physics, chemistry, descriptive geometry, as well as elements of architecture and ornamental drawing, the figure, and the history of the fine arts. The superior course of four years, which some desired to make five, consisted in a special condition in physics, chemistry applied to building, stereotomy, study of architectural styles, as well as of architectural composition and decoration, the history of architecture and the law of building.

Now you believe perhaps that at the end of their course the pupil academicians are awarded a diploma of architecture; but nothing of the sort. These pupils, after a final examination, "shall receive a diploma of approbation." These are the words of the decree, "Diploma of approbation," but, if you please, approbation of what? No one has ever been able to guess. Why did they not say, "Pupils who have passed the final examination with success shall receive an architect's diploma?" Messieurs, the architects, good or bad, leave the polytechnics, and we have not the courage to say frankly that the proper place for educating an architect is an academy of fine arts, and not a polytechnic school. Nevertheless, on this essential point two opinions exist in Italy. The partisans of the polytechnic schools contend that architectonic culture can be given in scientific schools, or rather insist that these schools can give such instruction, and the partisans of the academies of fine arts maintain the contrary opinion. Without desiring to draw you into this debate I remark in this connection that strictly neither one or the other of the two schools, with their respective courses of instruction, fill the bill in such a way as to give a complete architectural education. For example, architectural students scarcely receive any literary and classic instruction in polytechnic schools or in the academies, and what interest might this last education have for those among our architects who desire to devote themselves to the restoration of our ancient monuments, I do not need to tell you, as I have no more need to repeat to you that the restoration of ancient monuments and the whole cultivation of the antique is carried with us to extremes. A reservation may be made for the polytechnic students who have followed the courses of the Lycée, but this

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kind of polytechnic student is always represented in our schools of application by a very small number. Nevertheless, I do not wish to enter the field of exaggeration, or I might imitate Vitruvius, who made an architect something superhuman because of possessing encyclopædic knowledge. Now to come back to what I was saying, that is to say, that no ministry has had the courage to frankly affirm that the proper place for giving instruction in architecture is the Academy of Fine Arts. I ought to mention, however, that M. Coppino, by the establishment of complete schools of architecture, affirms by implication that his idea ran in the same direction as that which I have pointed out; but that bizarre diploma of approbation deprived this meritorious initiative of all seriousness. Perhaps it is the result of a mixture of parliamentary opinions. Whatever it may be, these complete schools of architecture will, conceived as they are, if not in a definite manner, solve the question of architectural study in Italy. It is a pity the present Minister of Public Instruction, M. Boselli, has not accepted the idea of his predecessor.

Evidently M. Coppino would have architects academicians, with the scientific education joined to an artistic education, and not polytechnic architects, and give in the polytechnic school only courses for industrial engineers and engineers for roads and bridges. M. Boselli, in his project presented recently to the Royal Senate, would like to reserve to the polytechnics the faculty of awarding a diploma of architecture. In the same way he would like to give the faculty of qualifying for the profession of architect (mark that there is no talk here of the diploma of architect) to the academies of fine arts at Rome, Florence and Naples, provided that the pupil academicians should receive their scientific instruction at the schools of application. So that one would have here again polytechnic architects and academic architects, and yet not a clear solution of a question which cannot be put off by incertitude and equivocation. But there is in it all something to be pleased with in the fact of these diplomated architects. As you see then, while in France the question of having one single official school of architecture, in the School of Fine Arts at Paris, has given rise to a lively agitation, and a group of societies has suggested the creation of a diploma to be given by the members of the societies themselves, while in France the notion of diplomas granted by societies has been conceived, in Italy, if the project of M. Boselli shall receive definite sanction, we shall have many series of official architects, but perhaps we shall not have any architects; or any definite solution of the question which relates to architectural studies in the kingdom; and as I have just shown the reorganization of these studies is in Italy demanded for many reasons. All its academic students, after having passed eight years (I refer to the new rules — eight years of study at an academy of fine arts), find themselves with an unfinished education and a license which officially is almost nothing. All these pupils are declassed, and almost always declassed through injustice. It is, therefore, with propriety that the academical students of the Institute of Fine Arts at Florence, at the end of the year 1888, addressed to the Minister of Instruction a petition showing him the false and unjust position which the State placed them in. They wrote "The young academical students inscribed in the courses of architecture in the academies of fine arts of the kingdom either are obliged to work like simple draughtsmen, or under the legal name of many professionals must prepare their architectural designs for a remuneration which is almost ridiculous and without the satisfaction of having their own names known."

The solution of the question of the architectural studies in favor of the ideas which these young academicians represent — these professors of drawing — cannot be longer delayed, and everything which aims at making architects artists will be received with us without any sympathy, I assure you.

At Milan, since 1872, we have had a school called the School of Master Masons, a unique institution of the kind in Italy. It was organized in such a way as to give a technical education to those who must direct masons in the stone-yard. Still, in this school in the way of science applied to construction, they do not go beyond what is taught in the School of Fine Arts at Paris, in the section from which come all the diplomated architects of France.

Now I am in a position to assure you, since I have among my pupils a goodly number of those who follow the courses at the School of Master Masons, that many of the pupil academicians follow the courses of the school of which I speak, and these young men are those who watch over and have the direction of several Milanese buildings, and sometimes themselves prepare the designs for them. Now I ask where shall we go to discover the solution of architectural studies in Italy, for this Milanese school could itself become the key of all our discussions and our desires. The fact is that we Italians desire to be the most academical people in the world, and so far as we are concerned, simplicity hardly exists. We love rhetoric before all, and we waste our breath and time in many useless things, which prove that we are not practical people. Without this in the solution which interests us we would not have sought up to the present time the impossible.

Ought the architect to be a man of science? No. He ought to be a man more artist than savant, just as the engineer should be a man more scientific than artistic. Let us try to distinguish the rôle of each, and the question is settled. The rest you know. Art is long and life is short, and while the world is as it now is society must resign itself to having architects and engineers; that is to say, artists and men of science.

A. Melani.

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

HOUSE OF FREDERICK BRADLEY, ESQ., BEACON ST., BROOKLINE, MASS. MR. GEORGE F. LORING, ARCHITECT, BOSTON, MASS.

[Gelatine Print issued only with the International and Imperial Editions.]

COMPETITIVE DESIGN FOR THE ERIE COUNTY BANK, BUFFALO, N. Y. MR. C. D. SWAN, ARCHITECT, BUFFALO, N. Y.

[Issued only with the International and Imperial Editions.]

COMPETITIVE DESIGN FOR THE ERIE COUNTY BANK, BUFFALO, N. Y. MR. W. L. FUCHS, ARCHITECT, BUFFALO, N. Y.

[Issued only with the International and Imperial Editions.]

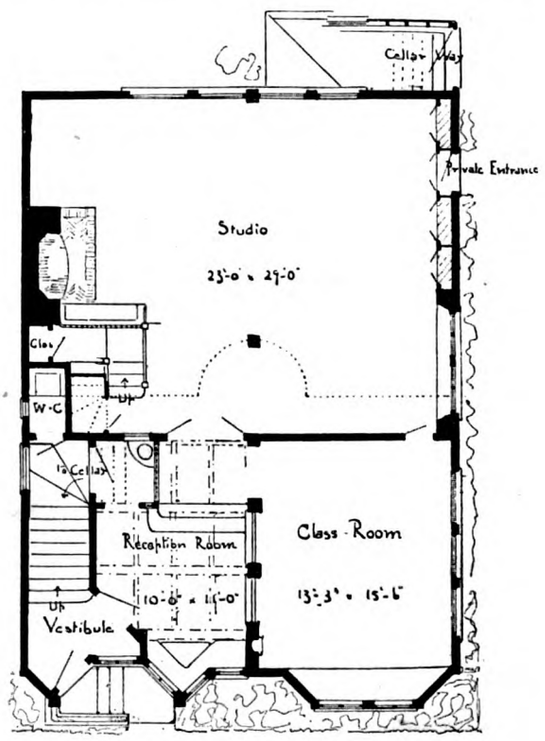
COMPETITIVE DESIGN FOR THE ERIE COUNTY BANK, BUFFALO, N. Y. MR. C. R. PERCIVAL, ARCHITECT, BUFFALO, N. Y.

[Issued only with the International and Imperial Editions.]

SECURITY BUILDING, ST. LOUIS, MO. MESSRS. PEABODY, STEARNS AND FURBER, ARCHITECTS, ST. LOUIS, MO.

THE FLEUR-DE-LYS, PROVIDENCE, R. I. MESSRS. STONE, CARPENTER & WILLSON, ARCHITECTS, PROVIDENCE, R. I.

THE Fleur-de-Lys was built in 1885 for Mr. Sydney R. Burleigh, and is occupied as studios by himself and several other artists. The front is framed up of heavy chestnut timbers filled-in flush with rough-cast plaster on wire lathing on boarding nailed to fillets on the sides of the chestnut framing. The carving of the timber-heads at the second story was done by Mr. Burleigh and the other artists associated with him in the building, as was also the modelling and coloring of the figures and other ornamental work in the plastering, most of this latter being put on with mortar mixed with color in



First Story Plan

the mortar-bed. Inside, the floors and roof are of factory-construction: planed-spruce plank on heavy spruce timbers, exposed beneath and coated with asphaltum, giving them a dark brown hue, with a peculiarly rich, velvety effect at the knots and hard places. The main studios are high-studded, with good north light, and have large brick fireplaces. These studios, and the rest of the building, galleries, doors, settles, etc., are finished in cypress, stained variously; and the lower studio in the first story is lined to a height of six feet and six inches with discarded window-shutters from various old

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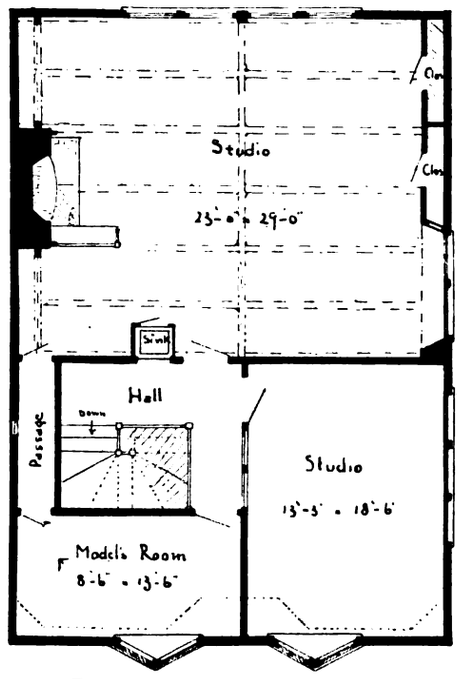
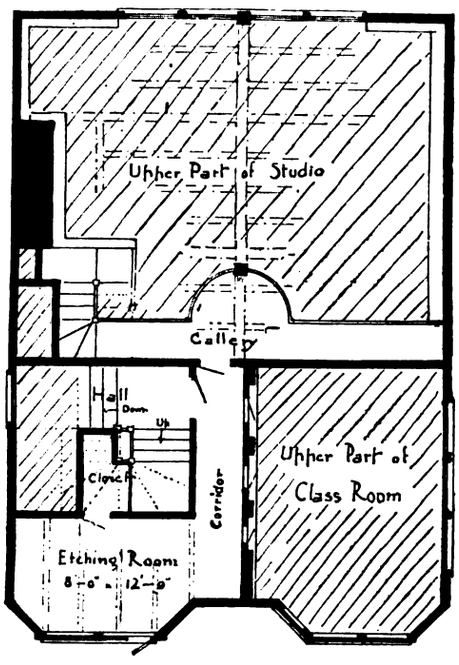
Providence houses. The plaster-work inside has also been incised, modelled and stained to some extent by Mr. Burleigh, who has got some very rich and striking effects in the staining of the plaster.



SECOND STORY PLAN



HALF-STORY PLAN

HOUSE OF GEORGE D. BARNARD, ESQ., ST. LOUIS, MO., AND STAIRCASE IN SAME. MESSRS. TULLY & CLARK, ARCHITECTS, ST. LOUIS, MO.

ROCHESTER ARCHITECTURAL SKETCH-CLUB COMPETITIVE DESIGNS FOR AN ARCHITECT'S OFFICE.

[Additional Illustrations in the International Edition]

WROUGHT-IRON BALUSTRADE. EXECUTED BY M. LEON BAUDRIT, PARIS, FRANCE.

[Copper-plate Etching.]

ALTAR IN THE CHRIST CHURCH, HALL, GERMANY. DESIGNED BY REV. JOHANN MARIA RITTER.

[Gelatine Print.]

HOUSE ON THE CORNER OF TEINFALT ST. AND THE FREYUNG, VIENNA, AUSTRIA. HERR CARL NEUMANN, ARCHITECT.

[Gelatiné Print.]

THE OLD CHURCH TOWER, DUNDEE, SCOTLAND.[1]

"PERHAPS one of the most singular features of Scottish architecture presents itself in the almost universal poverty of the church towers erected after the thirteenth century; for we must except those of an earlier period, if either Elgin or Arbroath are to be taken as the general type. Nor, indeed, can we call the lantern towers of Edinburgh, Haddington, or Aberdeen, plain, except by comparison with the lofty and highly enriched spires of the old English parish churches.

"At a first glance of the more recent ancient Scotch church towers, it would appear that the castle keep had been their aim, and that their object was rather the centre of a fortress than the peaceful spire pointing heavenward; but an examination of their attached buildings shows their peaceful mission, abundance of elaborate detail being within reach of the hand. It is, generally speaking, a striking difference between the churches of the north and south of Britain, that those of England generally increase in decoration upward, and those of Scotland as decidedly the contrary.

"Dundee Tower is now the largest specimen in Scotland, the most elaborately ornamented, and certainly the most picturesque. Yet, with all its ornament, how completely the massiveness of its masonry holds the grim keep tower in view, and it has claims to that title, having been fortified upon the occasion of the storming of Dundee by the Parliamentary troops under General Monck, in 1651.

"From a very early period, the important position of Dundee rendered it a constant object for contention. Twice did the town fall into the hands of Edward I; twice was it retaken from the English by Wallace and Bruce, and it was twice nearly reduced to ashes by the forces of Richard II and Edward VI. Of the ecclesiastical buildings of Dundee, the church tower alone remains as the silent witness of most of these stirring scenes; the attached church has long since virtually, and even fruitfully disappeared; for now, in place of one adjunct to the tower, there are no less than four religious edifices, under the same series of roofs, the entire mass being known as the 'Dundee Churches.' Never in modern times has old steeple been honored with such a numerous progeny, and well it bears them, raising its gigantic form to a height of nearly 160 feet.

"David, Earl of Huntingdon, built a church here before the year 1200, to commemorate his escape from a tempest. This building appears to have been destroyed by Edward I, and according to tradition was rebuilt to be again destroyed by Edward VI (1547–1553). It is impossible that this can be true, for no trace of such recent handiwork exists in the tower, and we should rather refer the destruction and rebuilding to the time of Richard (1377–1399). It is to the style of this period that the whole mass refers itself.

"In the tracery filling the circular-headed window on the western side of the tower, we recognize the system of window-panelling carried out more extensively in the cathedral tower of Iona; and we draw attention to this feature, because the effect produced is as original as it is beautiful, and because it is capable of being varied as a field of design without limit.

"Another feature of Dundee Tower we recommend strongly to the notice of the architect. It is the unbroken form of the external line of the octagonal staircase from base to summit, and the frequent repetition of its loop windows surmounting each other. This continuation of perpendicular line gives an air of loftiness to the mass, and completely neutralizes the lowering effect of the ornamental horizontal lines prevailing upon the different stages.

"And finally we recommend the imposing mass delineated in our plate to the notice of the men of Dundee, wishing at the same time that they would restore the west window, and thus give us the opportunity of correcting our own perpetuation of its present plastered deformity."

THE LANTERN OF ST. GILES'S CATHEDRAL, EDINBURGH, SCOTLAND.[1]

"FEW visitors of Edinburgh can fail to be acquainted with the main features of Old St. Giles's. A few years ago, when the city was less amply endowed with edifices of a spiral character than it is at present, the airy lantern of this church, situated at so great an elevation, was the main feature in the long, rugged outline of buildings covering the ridge of the narrow eminence from the Castle to the Canongate; its light and graceful details formed a fine contrast with the massive features of the Castle, and even yet it asserts a marked superiority in dignity and elegance over the modern steeples by which it is surrounded. This species of lantern, formed by cross-ribs as in groined arching, seems to be peculiar to the north of Britain. It does not occur further south than Newcastle, while in Scotland we find it still remaining in King's College, Aberdeen, and the Tron steeple in Glasgow; until lately it existed at Linlithgow, and formerly terminated the tower of Haddington. Of all the

[1] It should always be kept in mind that these illustrations from the "*Baronial and Ecclesiastical Antiquities of Scotland*," [1845] by R. W. Billings, are republished very largely for the sake of giving instruction in one manner of the rendering of architectural drawings.

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Scottish instances, St. Giles's is at once the richest and the lightest. The others had merely been formed by two crossed arches springing from the corbels of the tower. That of St. Giles's has an octagonal character, from two arches springing from the centres of the wall-plates. Along the intermediate spaces there is a parapet pierced with quatrefoils, having a flowered moulding at the projection, and cusps on the upper edge. The outer edges of the arches are adorned with crocketed pinnacles, and, supported by the general keystone, there springs from the centre of a cluster of small pinnacles, rising tier over tier, a graceful spire. The whole plan exhibits those capricious irregularities so frequently to be found in the finest specimens of Gothic work.

"The general plan of the Church is a cross, the lantern-tower springing from the meeting of the arms. Continuous with the extremity of the nave is an additional transept with a flat roof. The main transept has aisles, and the southern branch has projecting edifices on either side, which give it in itself the form of a cross. From the accompanying plate of the chancel, it will be seen that the pillars nearest to the centre are plain octagons, the arches corresponding in simplicity, while those at the east end are clustered with decorated capitals supporting moulded arches. It will be observed that the roof is groined, the ribs of the groining resting on the imposts of pilasters supported on corbels springing above the capitals of the pillars. The great east window and the clerestory windows are reconstructed from the ancient remains, a circumstance from which the mullions and mouldings are necessarily somewhat thinner than they originally were.

"*Historical Sketch.*—That some portions of this edifice are of considerable antiquity, a few features of its present architecture, and particularly the semicircular arched doorway now preserved in the transept, sufficiently testify; but in its earlier form it seems to have been a small and obscure parish church, for in the records of other ecclesiastical buildings it is seldom referred to. In an old ecclesiastical taxation of the Archdeaconry of Lothian, we find 'Ecclesia Sancti Egidii de Edinburhu' rated at 26 merks, while that of Restalrig, a small chapel near Leith, elsewhere mentioned, is reckoned at 25.[1] The earliest among the few notices of the edifice in the ecclesiastical records mentions that on the Sunday before the Feast of St. Thomas, in the year 1297, Donaca, daughter of John, son of Herveus, resigned certain lands to the convent of Holyrood, in full consistory held in the church of St. Giles.[2]

"It is somewhat curious to find that the church which became the principal ecclesiastical institution in the metropolis, and for a brief period a cathedral, was a dependency on the now obliterated monastery of Scone. Scone was one of the foundations of that ancient and mysterious religious community, the Culdees, whose constitution and rules, as well as their pastoral pedigree, have created so much curious discussion among ecclesiastical antiquaries and polemical disputants. When the Romish clergy gradually superseded the scattered institutions of the Culdees, Alexander I established in Scone a house of Canons Regular of St. Augustine, brought from the Church of St. Oswald, in Yorkshire. In early times, this now obscure place might well compete in importance with Edinburgh. In a charter of Malcolm IV, it is spoken of as the chief seat of government. It was occasionally the place where Parliaments were held. Alexander II and his son were here crowned, and both Baliol and Bruce began the royal careers so strangely contrasted in history by a coronation at Scone.[3] These incidents of the ancient importance of the spot prepare us to find that the patronage of St. Giles was conferred on the monastery of Scone by Robert III, and that in the year 1395 the Bishop and Chapter of St. Andrews, in consideration of the losses occasioned by recent misfortunes to the monastery of Scone, united the Church of St. Giles with the monastery, appointing that when James Lyon, then vicar, should cease by death or otherwise to hold the benefice, the canons of the monastery should enter on possession of the church, keep it in repair, and supply it with ecclesiastical services. The union was confirmed by a Papal Bull, which enlarges on the great expenses borne by the monastery from its being so close to the seat of government, and thus frequently entertaining assemblages of the nobles, met for the transaction of urgent business.[4]

"It appears from a contract noticed by Maitland, that a portion of the church was arched-in in 1380, and he has preserved the terms of a contract made between the Provost and community of Edinburgh on the one hand, and two masons, in the year 1387, for the construction of five separate chapels along the south side of the edifice.[5] The same historian records the foundation of several altars and chaplainries during the fifteenth century, which were probably the means of applying these chapels to ecclesiastical uses—of occupying the empty tenements. In the year 1462, considerable additions or repairs appear to have been in progress, for the Town Council then passed a rule that all persons selling corn before it was entered should forfeit one chalder to the church-work. In the year 1466, St. Giles's was erected into a Collegiate Church, the foundation consisting of 'a Provost, curate, sixteen prebendaries, sacristan, beadle, minister of the choir, and four choristers.'[6] Various sums of money, lands, tithes, etc., were appropriated for the support of the establishment. The chaplainries and altarages appear to have been very numerous; Maitland gives the names of about forty.

"The history of this church has been somewhat turbulent for that of a temple raised for the worship of the religion of peace. In 1558, during the time when the Queen Regent was adopting vigorous and daring measures for stemming the progress of the Reformation, it was resolved to carry forth from the church the image of St. Giles on that saint's day, and to lead through the town a procession of more than usual splendor. It was discovered, however, on approaching the shrine, that the image had been removed. A smaller statue of the saint, which happened to be in possession of the Grey Friars—a 'marmouset idol,' Knox calls it—was borrowed for the occasion. To give dignity to the ceremony, and impose a wholesome awe on the people, the Queen Regent for some time attended on the procession. The impatience of the citizens, who had formed a considerable mob, was restrained during her presence, but when she left the scene it speedily burst forth. Some of them, pressing gradually toward the image, professed to join in its support, while they endeavored to shake it down. This task, however, they found difficult, as it had been securely nailed to its supporters. The struggle and the triumph of the mob were delightful to Knox, who described the event with the inimitable glee in which he indulged on such occasions.[7]

"In 1571, when Kirkaldy of Grange held the city against the Regent Morton—or rather was fortifying himself and his party at the expense of the citizens, who suffered from the warlike operations of both sides—the tower of St. Giles was mounted with cannon, and served as a fortification. In the words of a contemporary, 'Thair wes placit in the steiple of Edinburgh on the samyne day thrie pieces of brasin ordinance, with victuallis and utheris necessaris for defending of the samyn.'[8]

"St. Giles's was the principal scene of the tumultuous dispute between King James and the leaders of the church party in 1596. The place where the King was then sitting is supposed to have been the Toll-booth, close adjoining to the church, but Mr. Chambers observes, that 'The contemporary accounts of the tumult, all tend to show that the King was sitting at first in the place latterly known as the Tolbooth Kirk, and that he retired for safety into the upper room of the new Toll-booth, latterly the Justiciary Court room; an account of the transaction very different from that hitherto given, which has always assigned the old jail as the locality of King James's terror and rescue. It also appears that the Octavians (a body of eight statesmen, into whose hands James had committed all his financial affairs and patronage) sat in the Tolbooth Kirk. It may be worthy of notice, that the latter building is often, in works of that age, called the Laigh Tolbooth, while the Justiciary Court room is styled the high or upper Tolbooth.'[9] The disturbance from which James felt himself to be in peril, arouse out of an address by Balcanqual, a popular preacher, who called on the Protestant barons and his other chance auditors, to meet the ministers in the 'Little Kirk,' where they tumultuously came to a resolution to 'Intercede' with the King, on the necessity of changing his policy, and dismissing from his confidence the councillors who had advised it. The progress of a deputation towards the place where the King was to be found, brought with it the mob who had created the tumult, and when the bold expressions of the deputation were seconded by a crush of the crowd into the presence chamber, the King grew frightened and made his retreat. When the deputation returned to the Little Kirk, they found that the portion of the multitude who had not attempted to follow them into the presence chamber were listening to an address by a clergyman of the name of Cranstoun, on the text of Haman and Mordecai. The auditors, hearing that the King had retreated without any explanation to the deputation, concluded that his flight was attributable to some deeper cause than personal fear. They rushed forth, shouting 'bring forth the wicked Haman,' and endeavored to batter down the doors of the Tolbooth. It was a disturbance in which there was not any definite and decided purpose—one of the few indeed in Scottish history where there was a sort of frenzied excitement, and scarcely a distinct aim. It was dangerous, however, and James was glad to escape to Holyrood.[10]

"For forty years after this event the edifice of the church seems to have been undisturbed by tumults, until the memorable attempt in 1637 to force the newly prepared service book on the Scottish Presbyterians. The first act of hostility in the great civil war of the seventeenth century may thus be said to have commenced within the walls of this church. This event occurred on 23d July, 1637. After the reader had read the prayers, Dean Hanna ascended the pulpit to proceed with the new liturgy. The storm then commenced, and the first missile—a stool—was discharged by the celebrated Jenny Geddes at the Dean. A small folding stool, preserved in the Antiquaries' Museum of Edinburgh, is said to have been the missile used on the occasion.

"To recur briefly to other matters connected with the history of this church. It was made the cathedral of the new diocese of Edinburgh in 1634. The patent of Forbes, the first Bishop, was dated on 26th January of that year. The last Bishop was Alexander

[1] Reg. Prior St. Andreæ, p. 29.
[2] Reg. St. Crucis, p. 81.
[3] "*Liber Ecclesiæ de Scone.*" Introduction.
[4] Ib., p. 149, 150.
[5] Maitland's Hist., p. 270.
[6] Maitland's Hist., p. 270. Keith's Catalogue, 468.
[7] Knox's Hist. Wodrow Edit., 1, 260.
[8] "*Diurnal of Occurrents*" (Bannatyne Club), p. 226.
[9] "*Minor Antiquities of Edinburgh,*" p. 175.
[10] See Tytler's Hist., vol. viii, p. 245, et seq. and the other historians of the period.

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Rose, who was translated from Moray in 1687, and in the following year the Revolution deprived him of his position and emoluments. 'He lived still,' observed one of his contemporaries, 'in the city of Edinburgh, and had the chance to outlive all his brethren of his order, and all the bishops likewise in England, who had been possessed of sees before the Revolution; so that he had much respect paid him, not only by the clergy of his own communion, but all the laity also of both nations.'[1]

* "At the Reformation the edifice was divided into compartments, each forming a separate place of worship. One of these, forming part of the north transept, and known by the singular name of Haddo's Hole, because Sir George Gordon of Haddo was there imprisoned for some time before his execution in 1644, was not opened as a place of worship until the year 1699. Before the late alterations brought the fabric into a symmetrical form, the various chapels mentioned above were grouped in a longitudinal mass along the south side, and various small edifices called the Crames, used chiefly as shops, were attached to their walls, as similar buildings still are to the exterior of the large churches in Belgium."

"THE MIRROR." MR. HAMO THORNYCROFT, R. A., SCULPTOR.

THE DRAWING-ROOM, REDHOLM, ENG. MR. JOHN BELCHER, ARCHITECT.

COMPETITIVE DESIGN FOR SHEFFIELD MUNICIPAL BUILDINGS, SHEFFIELD, ENG. MR. JAMES F. BELL, ARCHITECT.

THIS was considered a good design, and ran very close to those selected. The plan is a compact and well-arranged one. According to Mr. Waterhouse, most of the competitors had spoiled their plans by breaking up the front to Cheney Row in such a manner as to make it almost impossible to treat the elevation successfully; in fact, they more or less opened directly into the court-yards. Mr. Bell has avoided this mistake, and his design shows four symmetrical and well-balanced fronts that could be very successfully treated in either Classic, Gothic or Renaissance.

The author thought it necessary to place the mayor's suite of apartments in the most important and convenient position, and has, consequently, placed them along the whole of the principal front (Pinstone Street), which insures a magnificent suite over 170 feet in length. The anteroom is placed opposite the grand staircase, and leads into the reception-room, which in turn leads into the fine banqueting-room; the latter opens out and becomes enlarged at the Surrey Street end, and is well lighted by two fine bays. The reception and banqueting rooms are capable of being thrown into one fine apartment of 30 feet by 70 feet, which is sufficiently large for any festive occasion. In like manner, the Mayor's parlor and retiring room can be thrown together with an equally successful result, thus securing two magnificent apartments of about 30 feet by 70 feet each; while, on the other hand, they may be used separately, the rooms being well proportioned in either case.

From the banqueting-room a private corridor leads to the mayor's private sitting or retiring room, which is provided with a lavatory and water-closet. Adjoining and next to the banqueting-room is the butler's serving-room, with a lift to kitchens above.

It will be noted, on referring to the plans, that the author has managed to keep the various rooms of the Mayor and Council absolutely in the western portion, while the public offices are placed in the east, with the town clerk's office as near as possible to the Mayor's private room. Consequently, the author has been able to cut off the public communication with the Mayor and Council's apartments by placing private doors in the corridors, which would be kept locked, thus effectually excluding the public from this portion of the building, while at the same time the Council Chamber is so placed that both the Council and the public have access to it, the former without going into public corridors, and the latter without intruding on the privacy of the Mayor and Council. The author attaches much importance to this valuable point. The various committee-rooms are also kept private, but, whenever thought necessary, the whole suite can be thrown open to the public when the Mayor and the Council are not sitting.

The author in choosing a style for the elevations was influenced by a personal visit to the site, which showed him that though perfectly feasible to work out a good Classic or Renaissance design, the sharp runaway angles together with the surroundings pointed to Gothic as being more suitable and requiring less mechanical regularity than the foregoing style. In choosing this free form of thirteenth-century Gothic, the author thought to get more play and freedom for all his elevations.

COMPETITIVE DESIGN FOR SHEFFIELD MUNICIPAL BUILDINGS, SHEFFIELD, ENGLAND. MESSRS. FARROW AND NISBETT, ARCHITECTS.

THIS design was submitted in the recent open competition, and is of a freely treated Renaissance character. The position of the tower and other features was, to a certain extent, regulated by the disposition of the streets from which the building would be seen. The porte cochère has been designed with an open loggia over it on the first floor, as an attempt to solve the difficulty of treating this feature. The character of the drawing required by the conditions of the competition does not convey the effects of the varying planes of the elevation, a point to which the designers gave considerable attention.

[1] Keith's Catalogue, p. 64.

THE OLD COCOA HOUSE, CHESTER, ENGLAND.

THIS illustration is taken from a water-color drawing by Mr. A. H. Belcher, architect, which was exhibited at the Royal Academy last year. The building has been superseded, but it is well to have a record of so interesting an example of the style which is most associated with Chester.

STUDY FROM LIFE.

THIS illustration is from a pencil-drawing by M. Urbain Bourgeois, one of the best known of the Paris painters.

HENRY OGDEN AVERY.

THE death of Henry O. Avery removes one of the few organizers and superior workers for the good of the profession at large. One of those who had high ideals of professional intercourse and work, whose time was always at the disposal of the Architectural League and other societies with which he was identified. His acquaintance with all the allied arts made his service valuable, he had great efficiency and ability in organizing and aiding all enterprises that tended to bring architects together and to inculcate an *esprit de corps*. At a time when so many think only of the almighty dollar, he sacrificed his own interest in service, and *service* is the hardest thing to get and the most valuable when so unselfish as was his. It is sad to think that his work for the League was indirectly the cause of his death, for it cannot be doubted that working so heartily at exhibition time hastened the disease. W.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

BEAMS.

NEW YORK, April 26, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Your answer to "W. L. P.'s" inquiry, as to whether the notching of compound beams is correct as shown in "*Safe Building*," or as shown in "*Building Superintendence*," does not cover the case.

In spite of Profs. Rankine and Clark, and others, I must maintain that my method of making the notches in compound beams is the correct one, and you will find by referring to my book that I have distinctly called attention to the fact that my method is different from the way drawn by many eminent experts.

If the two parts *A* and *B* of the beam could be considered as acting *independently* of each other, Profs. Rankine and Clark would be right, for in that case the fibres when resisting strain would act as shown in Figure I: *i. e.*, the upper fibres of both *A* and *B* would

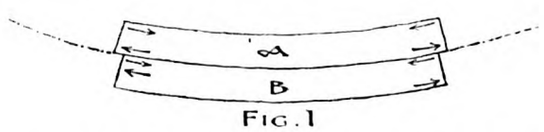

FIG. I

be in compression, or tending toward the centre; while the lower fibres of both *A* and *B* would be in tension, or pulling away from the centre, and the notching as given by Profs. Rankine and Clark (see Figure II) would be correct.

But the *very object* of making the compound beam is *to force both halves to act together as one beam*, and we so calculate the united

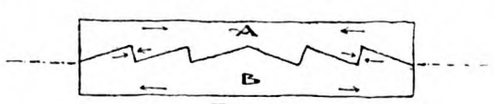

FIG. II

beam, in which case, unless the entire theory of transverse strains is to be upset for this especial type of beam, the upper fibres of the united beam will be in compression and the lower fibres in tension; in other words, theoretically all the fibres of the entire upper half *A* of the beam will be in compression, as shown in Figure III, and all

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the fibres of the entire lower half *B* will be in tension, as shown in the same figure; accordingly, we must draw the notches as shown in my book, and as reproduced here in Figure IV, the arrows

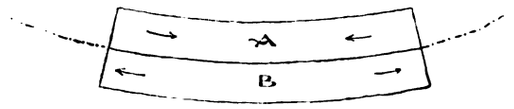

FIG. III.

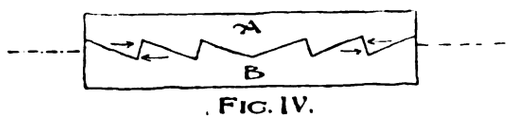

FIG. IV.

being added to show the direction in which the fibres tend to move when the beam is strained. Yours very truly,

LOUIS DECOPPET BERG.

[THIS is a very interesting matter, as well as an important one. Evidently, in order that the two beams, when put together, shall act like a solid beam of a depth equal to the net depth of the two united, the whole of the upper one should be in compression, and the whole of the lower one in tension, as Mr. Berg shows in Figure III. The question is, whether two beams, one placed above the other, and bolted together in the manner usual with built beams, act together as one beam, bringing, as Mr. Berg says, "the upper fibres of the united beam into compression, and the lower ones into tension"; or whether they act independently of each other, as in Figure I, the tendency to independent action being only partially checked by the bolts. If they act independently, in this way, Mr. Berg says that "the notching given by Profs. Rankine and Clark (see Figure II) would be correct," as it assists the bolts in preventing the independent action of the two parts. If they do not tend to act independently, but their fibres work as in a solid beam of the same net depth; all those above the middle line being in compression, and those below in tension, then Mr. Berg is undoubtedly right in his conclusions. We prefer not to take sides in the discussion, particularly as every one can settle the question of fact for himself, and get a useful lesson in doing so. Let any one procure two sticks, cut accurately to the same length, place one over the other, support them at the ends, and hang a weight from the middle: and then notice whether the ends present the appearance of Figure I or Figure III. Having observed this carefully, let him nail or bolt the pieces together, with about the proportion of bolts that would be used in a built beam, and test again. He can then make up his mind which way it would be best to face the notches. — EDS. AMERICAN ARCHITECT.]

THE PROPOSED NEW YORK STATE LAW FOR LICENSING ARCHITECTS.

ROCHESTER, N. Y., May 5, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — The bill now before the Legislature of the State of New York with reference to the licensing of architects, and which is published in your current issue, has been amended so as to provide for the nomination of the members of the State Board of Architects by the State Board of Regents of the University, and the phraseology of Section 5 is altered so as to read: "But nothing herein contained shall be construed to prohibit any person in this State from acting as *designer* of his own building, or as *designer* for any person employing him with full knowledge on the part of such employer that the person so employed is not a licensed architect, etc."; the word "designer" being substituted for the word "architect," very much to the improvement of the clause. It is hoped and expected that the bill will pass and be approved by the Governor. I enclose copy of the amended bill. Very truly yours,

JAMES G. CUTLER.

HOUSE-FRAMING.

BOSTON, MASS., May 6, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — In my article on house-framing, which appeared in your last number, there were some interrogation-marks which must have been puzzling to the reader. They were inserted for convenience in correcting my MSS., and I carelessly forgot to erase them before sending it in. Yours truly,

WM. ATKINSON.

NOTES AND CLIPPINGS

THE EXPLORATION OF PALESTINE. — The quarterly statement of the Palestine exploration fund, which has just been issued, although it does not record any extraordinary discovery, yet describes much interesting work that is in progress. Two cisterns have been found near the Damascus gate, the smaller of which would contain about three thousand skins of water. "It is entirely hewn in the rock, and before it was made into a cistern was rock-cut Jewish tombs. In the rock ceiling is a square, 13 feet by 13 feet, very nicely worked, with a kind of cornice round it exactly as in the tombs of the kings." By the excavations made on the eastern brow of Zion, it has been found that there were in ancient times caves and dwellings excavated in the rock, which in later times were converted into cisterns. Herr Schick describes a church which has been discovered in the village of Silwan, which has been hewn in the rock, and which contains a Greek inscription in which the name of the prophet Isaiah is mentioned. Herr Schick thinks it is probable that Isaiah's tomb may be under this chapel, and hopes by further digging to find an entrance to the cave which is under the rocky court and is at present full of earth, and to discover rock-cut tombs. He thinks that the rock-cut chambers of the church were Jewish tombs before the Christian era, and that afterwards they were converted into chapels by the Christians. — *Jewish Chronicle.*

PHOTOGRAPHING THE BOTTOM OF A WELL. — An experiment was made in photographing the bottom of an oil well last week at Warren. The instrument was let down a distance of 1,700 feet. The moment it touched the bottom a bright flash lit up the cavity, and a perfect picture of the hole was impressed on the negative It revealed, as the effect of the explosive shock, a cavity of fourteen feet broad and seven feet below sand. Rock, sand, pebbles and minute objects were distinctly revealed upon the plate. This device is likely to prove of the greatest benefit to science. — *Iowa State Register.*

TRADE SURVEYS

THE practical settlement of the eight-hour agitation throughout the United States, so far as the carpenters are concerned, opens the way for a multitude of new enterprises which have been held back for some time because of the uncertainty. It is the intention of the Federation of Labor to inaugurate strikes in other branches of trade, but probably not at a very early day. The United Mine Workers will next be invited by the Federation to make an effort for shorter hours. The selection of this craft shows that the managers of the movement are selecting points of attack where success is most probable. The miners are practically piece-workers, entering and leaving the mines, in numerous instances, as they please. There is a surplus of mining labor and of mining capacity. Scores of new mines have been opened during the past year, and old mines have been largely developed. The effect of all this is that the coal-producers have facilities for supplying much more coal than is wanted. It is very appropriate, therefore, for the mine-workers to agree upon a restriction of the hours of labor when there is no necessity for ten hours' work per day. Success may be regarded as a foregone conclusion in this case. Two successes will stimulate the Federated workmen to a third and other future efforts. Public sentiment has been strongly with the movement, the belief being that any change which promises to be advantageous to the workers at large, cannot be disadvantageous to general interests. Humanitarian sentiment is stronger than ever, and is growing in all circles. Even employers recognize that a movement which is universal cannot be really hurtful to them in the long run, after the necessary adjustments have been made The logic of many writers, who say that we cannot get along with eight hours toil, where ten has been the rule, shows that they take a very short-sighted view of the subject. The real point to be studied is the consuming-capacity of the people; whatever increases that, increases either the demand for labor, or for the greater productive power of machinery. A general enhancement of wages, instead of working detriment, is calculated to result in benefit, because of the increased purchasing power which it confers upon the workers. During the past two or three weeks a number of meetings have been held by railroad managements, and so far as their reports have been made public, the figures afford much encouragement to stockholders, and to those who are contemplating railroad extensions. Within the past week inquiries have been received for large lots of railway construction material. The car-builders have booked heavy orders during the past 30 days ranging from lots of 500 up to 10,000 cars each. Nearly all of the railroad companies are in need of equipments, and the car-builders and locomotive-builders, car wheel and axle makers, and manufacturers of all kinds of railway equipments and supplies are booking numerous orders.

There is a feeling prevalent in manufacturing and trade circles generally that this activity will continue pretty well into midsummer. During the past few months, great progress has been made in the consolidation of railway properties through purchase, lease, combination, etc. Figures are not available to show the degree of concentration affected, but influences are now manifesting themselves which were indicated in this column several months ago; viz., a genuine consolidation of railway interests will in a short time be brought about. This tendency will continue, and, through it, control will be secured over now competitive railway interests which no legislation and no amount of treaty-making will ever accomplish. Ownership will be concentrated. There are a score or two of roads only waiting to be bought out, the stockholders and managers being tired of the fruitless contest. It is a case of the survival of the fittest, and a great many roads are destined to lose their identity, and be swallowed up by the stronger systems, under abler management. The industries which have not already shown increasing activity will do so shortly. In the first place, the great body of buyers of supplies, material, etc., have been proceeding in a cautious way for months past, but are now ready to change their policy. They remember that for years past higher prices have frequently prevailed during midsummer, and the possibility of an advance is now apparent to many, although there is in reality little cause for such apprehension. Prices in all probability will remain about where they are, although there are thousands of buyers who are beginning to think otherwise, and are making inquiries and offers for the supplies they need for the summer. In the iron trade, nothing of importance has been developed, except that numerous inquiries have been received by rail-makers for rails, by locomotive-builders for locomotives, and by iron and steel manufacturers for ship-building material. Building material has been active all along, and a stirring demand for lumber is now setting in, especially for Southern hard woods. Spruce and hemlock have recently advanced, and there are rumors that yellow pine will shortly share in the improvement; but there seems to be no good reason for this apprehension. The anthracite coal trade has slightly improved, and production is now a little over 100,000 tons per day. The bituminous coal mines along the Allegheny Mountains are producing 250,000 tons per week, and are now 800,000 tons ahead of last year's output to this date. In Western Pennsylvania, coal-mining operations are pursued with great vigor. Throughout the Ohio and Indiana block-coal fields the same activity is spoken of. In natural-gas districts, nothing of special importance has been developed, although a few wells have recently been added to the list of good gassers.

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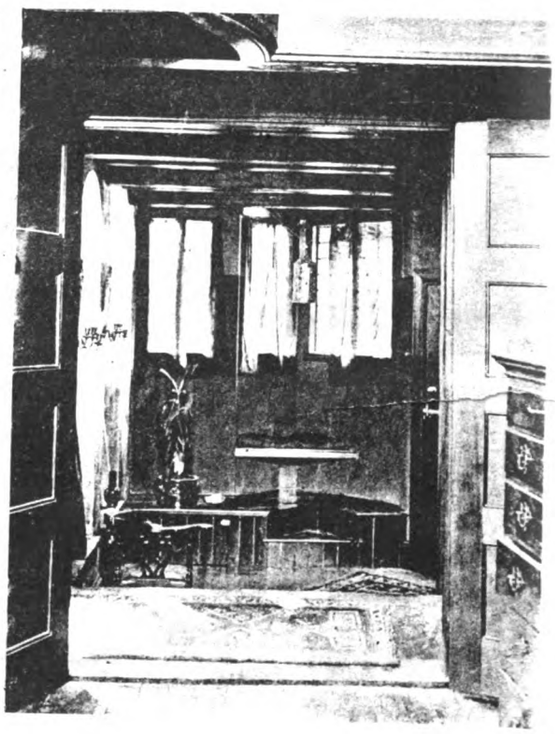
INTERIOR VIEWS OF THE FLEUR-DE-LYS.



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"SIGN OF THE FLEUR DE LIS"

Studio of F. R. Burleigh & C. W. Stetson — Stone, Carpenter & Willson, Archts.

Providence, R. I.

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BASEMENT PLAN
REAR ELEVATION
SECTION A-B

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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MAY 17, 1890.

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THE first Annual Exhibition of Architectural Drawings of the Boston Architectural Club opened Monday evening with a brilliant reception. In point of the number and interest of the drawings shown, it is by far the best exhibition of the kind ever given in Boston, and one of the best that has been presented anywhere, in this country or any other. We shall take opportunity later for an extended notice of the drawings shown. Meanwhile, it is gratifying to see that the public interest in the affair appears to be very general, and the indications are that the undertaking on which this energetic young club has spent so much effort will prove very successful.

THE strike of the carpenters in Boston for an eight-hour day appears to be nearly over, and the prospect is that the men, or rather, their conceited and reckless leaders, will be totally defeated. Meanwhile, it will do people who are interested in building matters good to reflect upon what they owe to the meddlesome demagogues who undertook this year to force upon our mechanics the decrees of an "International Committee" sitting in secret session in Paris or Geneva. During the winter, the prospect for an active building season in Boston was brighter than at any time for at least ten years. Innumerable projects had been made, and had, to some extent, been brought into the architects' offices, when, about the first of February, the announcement was made that the well-known mischief-makers of the building trades would undertake to carry out in Boston the orders of the foreign "International Committee." About the same time, the freestone-cutters' antics commenced, and the people who had set apart money for building, finding that they were likely to be delayed for freestone, and might, very possibly, have trouble about the carpenter-work of their intended structures, abandoned or postponed their schemes, and invested their money in some other way. According to the Inspector of Buildings, who has the best possible opportunities for judging, the amount of building in Boston this season will not be more than half as large as last year, and the carpenters, masons, plumbers, plasterers, painters and architects, whose living depends on building, will have to content themselves with half their usual income, while the demagogues, whose desire to advertise themselves has deprived them of the other half, will impute the deficiency to the "capitalists"; that is, to the very persons who desired to give their fellow-citizens employment, and were prevented from doing so. What the men themselves secretly think of the matter, and would say about it if they dared, may be inferred from a letter written to the Boston *Record* a few days ago by a woman, who inquired, with reason, whether this was a free country, where men who wished to work were obliged to stand idle until the people who were ready to employ them would promise to hire them for only eight hours a day, whether they were willing to work longer or not. To her mind, an hour a day taken from the man's work meant an hour added to the toil of his wife and children, and she thought that this was the opinion of a large part of the men, who, however, dared not express it. With a curious mixture of the feeling, so pertinaciously inculcated upon poor people, that the newspapers and the rich men are against them, with the sentiment which is habitual in the trades, and is not unfounded, so far as newspapers are concerned, that no one dares offend the labor leaders, she concluded her letter by saying that she supposed the *Record* would not be willing to publish it — an apprehension which the editor met, much to his credit, by printing it *verbatim*.

THE Rotch Travelling-Scholarship for 1890 has been awarded to Mr. William T. Partridge, of Boston. Mr. Partridge is well-known in the architects' offices as a skilful and ambitious draughtsman, and his work for the examination seems to have been highly creditable. There were this year some seven or eight competitors. The holder of last year's scholarship, Mr. Henry Bacon, has already sent home some most beautiful work in the way of measured drawings, and it is to be hoped that this branch of study will be followed more closely than it has hitherto been in most cases. The new scholar will take with him the best wishes of his late associates in Messrs. McKim, Mead & White's Boston office, as well as of those in our own drawing-office, who will be pleased to see so much industry and talent rewarded.

M. BLANCHEPIERRE makes, in *La Semaine des Constructeurs*, some excellent remarks on the proportion of pedestals to the statues which they support. It seems that a statue of M. Paul Bert, the distinguished administrator of the French colonies of Annam and Tonkin, has been made in Paris by M. Alfred Lenoir, and set up provisionally in the Place de la Sorbonne, before removing it to its destination at the colonial city of Hanoi; and M. Blanchepierre takes occasion to criticise the dimensions of the temporary pedestal on which it is mounted, and which, as he says, crushes by its size the surrounding buildings. This particular fault, he thinks, is common to many modern monuments. The worst examples are to be found in the colossal figures of the Virgin, or of saints, which are perched either on the steeple or the roof of so many French churches, where nothing is visible of them but a bare outline, altered in proportions by the effect of the light background, and devoid, so far as can be seen, of all charm of modelling and expression, while they are so out of keeping with the surrounding landscape as to shock the sensitive eye. Where, as he says, the pedestal has been carefully studied by the sculptor, it is almost always small and low. Rude, after preparing the model for his statue of Marshal Ney, designed a pedestal for it. Notwithstanding the greatness of the subject, the sculptor could not find that the grandeur of his conception was heightened by a tall pedestal, and, proportioning it as best he could to the whole design, he made it less than twenty inches high. The architect Duban, with the same artistic perception of the influence of the pedestal on the statue standing upon it, altered the pedestal of the statue in the middle of the arcade of the Château d'Anet twenty times before he was satisfied with the result, and until we can do something better with our statues than to hoist them indiscriminately into the air, as if they were lightning rods, M. Blanchepierre thinks there is still something for us to learn in the art of architecture.

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THE Madison Square Theatre, in New York, always famous for its stage machinery, has surpassed itself in the mechanism used in producing the illusion of a horse-race in the play of the "County Fair." The stage is rather a small one, yet three thoroughbred horses, ridden by expert jockeys, run at their utmost speed over a straight course a mile or more long without getting beyond the proscenium arch, and arrive at the goal amid the shouts of the excited audience, which cheers the horses alternately as they gain upon each other in their keen struggle. The secret of this remarkable performance is, after all, a simple one. The floor of the stage is removed for the race, and the turf of the race-course, which appears in its place, is composed of three strips of compressed paper. These strips form endless bands, passing over rollers set beneath the stage, at opposite ends, and actuated separately by powerful machinery. The movement of the upper surface of the bands is in a direction contrary to that of the racing horses, and the speed is as nearly as possible that of the particular animals employed when running at their best pace, so that, although they put forth their utmost exertions, stimulated by the whips and voices of the jockeys, they remain constantly in or near the middle of the proscenium opening. As the story of the play requires that a certain horse should win, his band of fictitious turf is made, near the last, to move a little more slowly than the others, so that he comes in victor by half a length. To increase the illusion, the scenery in the background is made to move in two planes. The distant objects are painted on a "flat" scene, which moves like a panorama, on vertical rollers, but changes place slowly, while the nearer details are shown on a separate roll, of nearly the same kind, which moves almost as fast as the horses. Another essential element, the effect on the horses and riders of rapid passage through the air, is supplied by means of a powerful blast from a blower, placed behind the scenes, and pointed at the advancing horses. This makes the manes and tails of the flying steeds flutter with a violence appropriate to a gait of thirty miles an hour, and the effect is complete.

THE different Classical schools in Athens are already busy with explorations, which, according to the *Builder*, promise to be of much interest. The American School, during its suspense as to the success of its efforts to raise funds for the excavation of Delphi, has been at work at the site of Platæa, the little city which sent its one regiment to help the Athenians drive back the Persians, and was subsequently the scene of the greatest battle of the Persian War. The town, after its destruction by the Thebans in the Peloponnesian War, was rebuilt by Alexander, and offers little interest, compared to Delphi; but some curious Byzantine work has been discovered, which makes amends for the poverty of Classic material. The British School has undertaken excavations this year for the first time, and is at work at Megalopolis, in Arcadia. This, though dating only from the time of the Peloponnesian War, was a large city, and the ruins of the theatre, the most extensive in Greece, have already been uncovered, while nearly all the trial pits reach the foundations of buildings. While the British School will hardly find anything of poetical interest in Megalopolis, the French, who are digging at Trœzen, in Argolis, will hardly find anything else. Trœzen itself was founded by and named after the son of Pelops, who, as all the world knows, was, when young, cut up by his father and stewed to furnish a banquet for the gods, and who, after being restored to life by Jupiter, had to wear an ivory shoulder, to replace the piece which Ceres had eaten.

TRŒZEN the son of Pelops was brother to Atreus, and thus uncle to Agamemnon; so that the city of Trœzen, and the Mycenæ of Agamemnon, are likely to show some curious relationship. Trœzen's great-nephew, again, was Theseus, who was born in the town, but went thence to Athens, where his well-known adventures began with the expedition for the slaying of the Minotaur. It was long afterwards that Hercules erected a monument to the family, and with this pious act the history of the principal inhabitants of Trœzen seems to end. The Germans are making excavations in Cyprus, and Dr. Schliemann is preparing for renewed work at Troy, so that the season promises to be rich in archæological discovery.

THE *Deutsche Bauzeitung* gives, as an interesting novelty, a description of the method of building small houses in Belgium, particularly in Brussels, which is much more like our mode of city building than the practice which prevails in Paris or Berlin or Vienna. In Belgium, it must be premised, tenement-houses are not popular, each family living, if possible, in a house by itself, so that the modern portions of Brussels or Ghent, which look something like Philadelphia, are much less imposing than cities like Vienna, where nearly all the new buildings are immense barracks, containing a large number of families. The pattern of the Belgian city houses is generally nearly the same. The basement contains the kitchen and store-rooms, the first story is devoted to parlor and dining-room, and there are two or three stories of bedrooms above. The soil in Brussels is a loamy sand, and, although it is easily excavated, the wheels of the excavators' carts sink deeply into it when loaded, and it is, therefore, customary to facilitate the removal of the material by laying a rough track, composed of a pair of channel-irons placed on the sand, in which the wheels of the tip-carts can run. This strikes us as an excellent idea. The wear on the channel-iron track must be slight, and the difference in the size of the loads which can, with its help, be hauled out of the excavation must be very appreciable. The remaining part of the system of construction is not in all respects so commendable. A footing of rough concrete is laid on the sand, and the walls then carried up, and, as no special pains is taken, in building small houses, to find a firmer stratum of sand to lay the concrete on, many settlements take place. The bricks in common use are so soft and weak that the workmen do not use hammers on them, cutting them with the trowel as required. When delivered at the building, it is common to find about one-fourth of them broken, but the fragments, as well as the whole bricks, are taken up on the staging in baskets, as if they were eggs, and used indiscriminately in the work. Tin hods are used for conveying the mortar, which is made on the ground in a very unscientific fashion. The first step is to dump the lime in heaps in the street. Then a few pailfuls of water are thrown upon it, and sand is strewn over the heaps. After a few days the lime is found to be reduced to a dry powder, containing, naturally, unslaked lumps. The second part of the process is to make a ring of sand on the ground, shovel in the lime-powder from the preliminary heaps, and mix with water; then stirring in slowly the fine, loamy sand from the excavation until the result satisfies the workman in charge. The mortar so made contains many unslaked particles, which swell later, and cause various blemishes. The outside and party-walls are sixteen inches thick, and the inner partitions are either of eight-inch brickwork or of studding, lathed and plastered. The roofs and floors are either of brick arches between iron beams, or of wooden beams, boarded on top, and plastered on laths underneath; the fireproof filling between wooden beams, so common in France and Germany, being here unknown. The beams, if of wood, are light, but are usually bridged with what we should call double herring-bone cross-bridging; but the bridging-pieces, instead of being simply cut in and nailed, are mortised at each end into the sides of the beams. This mortising has no advantage over nailing, and requires an immense amount of time and labor, besides seriously weakening the beams. Perhaps, like so many of the peculiarities of Swiss construction, it is a reminiscence of a period anterior to the iron age, when all woodwork was put together without nails. As, by law, any person can put floor-beams to the centre of the party-wall which bounds his house, the natural consequence is that no flues are allowed to be built in the party-walls, and chimneys have to project about two feet into the room, in order that the flues may not encroach upon the wall. When, as is very common, in order to save fuel, the fireplace opening is closed, and a stove set in front of it, the total space occupied in the width of the room is very considerable, and in the better class of houses the heating is done by a furnace in the cellar. In plan, most of the houses are arranged with a narrow hallway along one side, and a front and back room opening into each other on the first story, with double doors; but some follow the arrangement now quite common with us, in having the stairs in the middle, between the front and rear rooms. Most houses have a third room in an extension, beyond the dining-room, which may serve for a kitchen or library, and many have conservatories opening out of the dining-room. In Ghent, particularly, "Flora's city," as the Belgians themselves call it, nearly every house, however small, in the modern part of the town, has a conservatory, bright with flowers.

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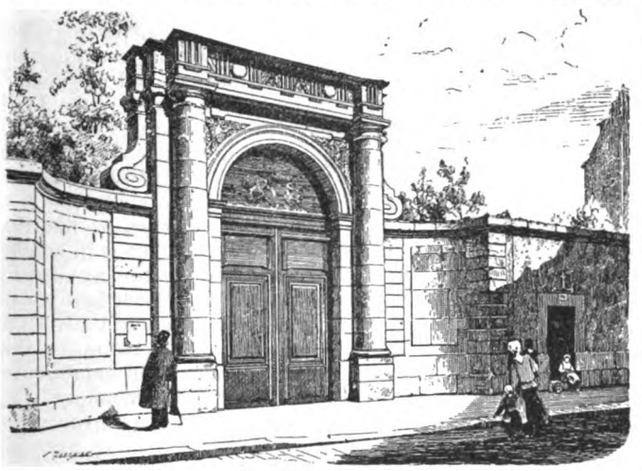
RELIGIOUS ARCHITECTURE.[1] — VI.

III. RELIGIOUS ARCHITECTURE OF ANTIQUITY. — GREECE.



Gate of the Convent des Filles de la Croix, Rue de Charonne, Paris.

ABOUT the year 1100 B. C. the Dorians invaded Greece, and occupied all the northern part of the country. The Achæans were driven southward into Attica, and thence to the neighboring islands, and as far as the shores of Asia, where they established a vast number of Ionian colonies.

The two races were totally dissimilar; the Southern was vivacious, brilliant and capricious, incapable alike of discipline and perseverance, while the northern was slower and heavier, but possessed of a spirit of persistence and organization, and not without resemblance to the Roman people. Each race furnished certain traits to the Greek character: from one came keenness, delicacy, subtlety even, clothed in youthful, graceful and natural forms; from the other was inherited a spirit of devotion to the city which, under the ancient organization, wholly subordinated the individual and his interests to the superior interests of the human group to which he belonged. One was flexible, gay, passionate and, it may be said, materialistic; the other was grave and severely spiritualistic.

From earliest times the Greeks were mariners. In the eighth century B. C., after the invention at Corinth of the galley, which admitted of much longer and safer sea-voyages, the Grecian colonies multiplied. Naxos, Syracuse, Megara, Messina, Gela, Sybaris, Crotona, Rhegium and Tarentum were founded, and these in their turn established Cyrene and Marseilles. Egypt was opened, and Thrace and the shores of the Black Sea were colonized. Cumæ, Tenedos and Lesbos each became the mother-land of thirty different cities, and the colonies of Miletus numbered eighty.

Evidently it was a powerful civilization, whose foundations were laid at that moment, powerful in its fleets, powerful in its mariners and soldiers, and powerful in its accumulated wealth. Vast edifices were erected by the colonies in their earliest days, richer even than those of Greece itself; the mother-country was obliged to have recourse to the liberal contributions of her colonies to build her first temples, since she was unable to bear the expense of the undertakings herself. It was in this way that the Temple of Delphi was reared, and its construction occupied thirty years; long before that time, in the days of Herodotus, the two greatest edifices known were the Artemisium of Ephesus and the Heræum of Samos.

Magna Græcia possessed, from the sixth century B. C., the Temples of Syracuse and of Selinus, and three of the temples of Pæstum.

Toward the sixth century B. C. a change began to take place in the conditions of fortune and wealth; the colonies lost ground, or were gradually invaded by neighboring nations. Hellas, on the contrary, gathering in their heritage, became more and more prosperous. In the fifth century B. C., the Parthenon, the Propylæa, the Erechtheium, the Odeium, the Temple of Eleusis and the Temple of Phigaleia were erected.

At the same period the supremacy passed from Sparta to Athens, and the latter city took command of the Greek troops and fleets in the great war against the Persians. The population of Athens increased rapidly. "The latter was not slow[2] in transferring within her walls, along with the treasure of Delos, the direction of the affairs of the Confederation; her allies and subjects were forced to bring their suits to her courts for judgment. Magnificent *fêtes* were created to attract them to the metropolis. . . . Athens assumed the burden of equipping, by means of subsidies, the greater part of the fleet, and in that way drew a large population of seamen; these settled at the Piræus, which was connected with the old town by long walls." At the same time, Athens was the *entrepôt* of all Greece. Her silver mines of Laureium and gold mines of Thrace threw the coinage of money into her hands. In a word, Athens was at that moment the veritable capital, bulwarked by a budget supplied by the tribute of her allies. The surplus of this budget was lavishly and intelligently expended for the embellishment of the city. It was this money that built the Parthenon, the Propylæa, the Erechtheium, the Odeium and the Temple of Eleusis. However beautiful these works may have been, there is no doubt that the allies sometimes raised a timid protest against their construction, for Pericles took the trouble several times to explain to them that "the tribute, once paid, no longer belonged to those who paid it, but to the receivers, and that the latter were bound only to fulfil the obligations which they imposed upon themselves in receiving it."

It was between the sixth and fifth centuries B. C. that the earliest Grecian religious edifices known to us were erected. Like most primitive peoples, the Greeks were doubtless content at first to assemble for religious ceremonies in a sacred enclosure, or *hieron*, probably situated on an eminence. Then, as the god to whom the worship was addressed assumed a more definite, distinct and, later on, a more personal character, a separate dwelling, the *naos*, was constructed for him within the enclosure. This was the origin of the temple which, among the Greeks and their Roman imitators, was never anything more than a structure consecrated to a divinity, and in which the priests of the worship performed the ceremonies; it was in no sense a place for the faithful to assemble.

These uses, so unlike those of Christian churches, were the cause of the very modest proportions of the temple, while the peribolus, which embraced all the annexes of the sacred edifice, and was designed to admit the multitude, was often of great size and importance.

The temple was intended, first of all, to protect the image of the god; this purpose would naturally restrict the dimensions of the structure. The Erechtheium was not more than 32.8 feet by 65.6 feet; in the Parthenon, the interior *naos* was 65.6 feet by 98.4 feet. Again, the temple was often very small in proportion to the size of the statue; the Minerva of the Parthenon was 45 feet high without her lance, and the roof of the *naos* was only 55 feet above the floor. Strabo, in speaking of the Jupiter of the Temple of Olympia, remarks: "If the god should rise, he would break through the roof." It was even necessary in some cases to perform the sacrifices outside the temple, as is shown by a Pompeiian painting, in which the altar is stationed without the structure, surrounded by two rows of persons. The processions were very probably relegated to the exterior of the *cella*, and even of the porticos, for the galleries seem to have been ordinarily too narrow for the passage of a throng. In the large temples, the steps observable in the basement were altogether too high to serve as stairs of access; they were purely decorative, and there were no stairs proper except in front of the entrance. These sufficed for the service of the temple, but were surely not adequate for the circulation of a large crowd.

It is in Sicily, and later at Rome, that we must look for those structural modifications which opened the temple to the multitude; namely, stairs running across the entire front, and galleries broadened by the pseudodipteral disposition.

The Greek temple served still another purpose. As the presence of the god rendered it a holy and respected spot, it was used as a treasury. In the *cella*, which was divided into two parts, the posterior portion, or *opisthodomus*, was utilized as a repository for the public funds; while the *naos*, or sanctuary enclosing the idol, received at the same time the sacred ornaments, the lamps, chalices, perfuming-pans, religious furniture, etc. According to the official report of the Hellenotamiæ, the Parthenon contained "gold and silver vases and phials, a gold crown, shields, helmets, gilded swords, a silver-gilt mask, griffins, golden serpents, lions' heads, a statue of a young girl on a column, nine folding-chairs, an ivory table, lyres, eight Chian and ten Milesian beds, and ivory quivers." The Erechtheium had also its share of valuables; aside from the tapestries of the *pronaos*, a folding-chair, the work of

[1] From the French of P. Planat, in Planat's "*Encylopédie de l'Architecture et de la Construction.*" Continued from page 81, No. 750.

[2] E. Boutmy. "*Philosophie de L'Architecture Grecque.*"

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Dædalus, a cuirass belonging to Masistius, and the scimitar of Mardonius were deposited there. One can imagine what treasures must have been housed in the Temples of Delphi and Olympia, where offerings accumulated. The Greek temple was then put to many and various uses, which were quite out of keeping with the traditional idea of a Christian church.

Such was the religious edifice adapted to Greek views and customs, and which was destined to furnish the world many admirable architectural models.

It is scarcely a matter of question to-day that Hellenic art was half Oriental in its parentage. Beulé has thus summed up the present currently received opinions on this subject: "Their manners[3] and industry were the result of contact with Asia; commerce, navigation and piracy contributed still more than did the Trojan War to their progress in these respects. When art made its appearance in the sixth century B. C., we find it imbued with Oriental traditions. The pyramids, remnants of which are to be seen near Epidaurus and Argos, the ruins of Mycenæ, and especially the decorative débris transported to the British Museum from Mycenæ, the most archaic remains of the rest of Greece, the tombs and the oldest vases found in them, the testimony unwittingly dropped by Greek authors — all go to show how very close were the ties which bound the ancient art of Greece to the art of the Orientals." Without attempting to settle the disputed question of the Egyptian origin of the Doric order, or of the Assyrian origin of the Ionic, we can, nevertheless, hold to these general terms, which express a general and, under this form, incontrovertible fact.

Having noted this influence, let us follow the gradual development of the Doric order in Greece, which was the starting-point of the entire Grecian architectural system, and also its subsequent transformations. By this means we shall be able to mark the various stages of progress which carried Grecian art from the primitive temples, still bearing the impress of barbarism, up to the purest and most beautiful edifices of the age of Pericles.

The earliest temples were built of wood. At Olympia and Metapontum, the wooden columns of the old temples were preserved in the structures rebuilt of stone. It is well-known that the Temple of Neptune, near Mantineia, was made wholly of intertwined oak trunks; Adrian reared an immense edifice around it, but he took care to preserve the venerable wooden temple inside the modern construction.

Many archæologists are, consequently, disposed to seek in the wooden structure the prototype of the elements constituting the Doric order. The tree-trunk, tapering upward, became the circular column;[4] the strokes made by the axe in squaring the beam suggested, it is said, channellings or flutings, which were at first flat, but were later hollowed or cut into the stone. Between the wooden pillar and the supported portions it had been necessary to enlarge the head of the pillar and interpose a shelf for greater stability, and hence originated the capital and abacus. Architraves spanned the spaces between the pillars, in imitation of the ancient wooden beams. The beam-heads appearing above became the triglyphs, and the pins used to keep them in place were represented by the guttæ.

Vacant spaces must have been left between the triglyphs, for in the *Iphigenia at Aulis* Orestes is obliged to slip through these openings into the temple; a similar indication of the fact also occurs in the *Bacchæ*. It became necessary then to close these apertures by means of a small board; this was the origin of the metopes.

The roof, with its two slopes, furnished the pediment; the survival of the rafters and even of the pins in them has been determined by antiquarians; the dentils are the round sticks, which were afterward squared, and so on. Everything, then, can be explained in accordance with the theories of archæologists. In any case, it is true that even man's inventions are always inspired by some visible object; and it may certainly be legitimately assumed that a direct affiliation existed between the primitive wooden structure and the earliest translations of it into stone by the Dorians.

The Doric order, which served as the point of departure for all the other orders, did not, however, assume at once its final proportions. It may be said to have been subject to ceaseless variations. "Heavy and squat at first,[5] soberly decorated and painted in severe tones, it at length reached, by slow stages of progression, its highest perfection, when it displayed a grandeur full of power, a wealth decorously lavished, and hues which were at once brilliant and harmonious; then, passing these bounds, it attained slenderer proportions, and, seeking after delicacy, exchanging strength for refinement and elegance, it entered upon the path of decadence. Not only is the Doric of the age of Pisistratus distinguished from the Doric of the times of Pericles and of Alexander, but shades of differences are discernible through each period, and there is, as it were, a continual transition. . . . For example, if we study the relation of the height of the column to its diameter, we find that the columns of the oldest temples are four diameters in height; then, later, they are 4½, 5, 5½ and 6. If all the monuments of Greece had been preserved, we should discover here a constant progression, corresponding to the progress of time. The dimensions of the entablatures vary in an inverse ratio; that is to say, as the columns became slimmer, the entablatures diminish, in order not to appear heavy and inharmonious."

The oldest Greek temple of which any important ruins now exist is probably the Temple of Corinth. These were six columns in front and thirteen on the sides; there must have been a pediment and antifixæ in terra-cotta, as this invention had already been made by the Corinthians themselves. In the interior there was a *pronaos* in front, a *cella* in the centre, and an *opisthodomus* in the rear. The columns are not fully four diameters in altitude; this fact is good proof of the antiquity of the building; the shafts are monoliths; the angle-column is nearer than the other columns, and it is probable that, even at this period, its diameter was somewhat greater than that of the others. The architrave is very heavy. The temple was dedicated to Minerva or to Juno.

The Temple of Delphi belongs to a little later period; the architect was Spintharus of Corinth. It was begun about the year 540 B. C., where a first sum of $336,000 had been raised by subscription for its construction. The principal façade was in marble.

The temples of Syracuse are of the same epoch. According to Hittorf, the dimensions of the columns in the most important of these are as follows:

Height	27.89 feet.
Base diameter	6.23 "
Upper diameter	5.25 "

The curve of the capital is as depressed as in the Temple of Corinth, and the entablature is as heavy.

The Temples of Selinus date from the sixth and fifth centuries B. C. We remark in them, and notably in the one dedicated to Jupiter Agoræus, a departure from the customary design of this kind of edifice, and one which is peculiar to Sicily: the steps, of the ordinary height (from 9.45 inches to 5.90 inches), extend entirely across the façade, and the width of the peristyle is exceptionally great; the porticos were thus made accessible to the multitude. Within, active circulation was possible, as the rear wall, or *posticum*, was pierced with three doors, like the one in front.

Pæstum, or Posidonia, was a Greek colony. The temples (Figures 1, 2), which are still to be seen, are of the sixth century B. C., and were erected two hundred years after the founding of the city. The most remarkable of them is conjecturally called the Temple of Neptune. The ratio of the height of the column to the diameter is about 4½; the columns are 29.10 feet high, the entablature 12.30, and the pediment 10.43. The impression is of heaviness.

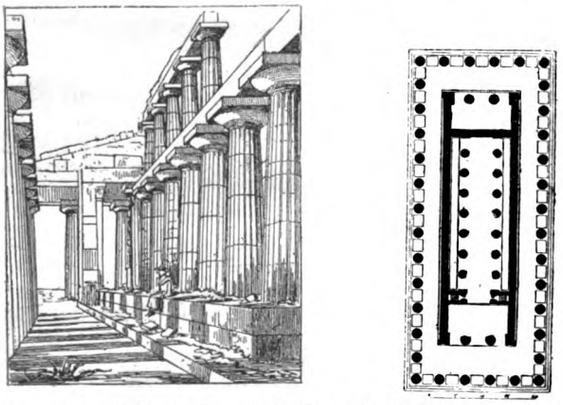

Figure 1. Interior View and Plan of the Great Temple of Neptune, at Pæstum (6th Century B. C.).

[3] Beulé. "*Histoire de l'Art Grec.*"

[4] See, apropos of this, the two antique columns in the Louvre, in the form of tree-trunks. These curious specimens seem to indicate that from early times the analogy had at least been noted, if, indeed, there was not in them a reminder of the origin of the column.

[5] Beulé. *L'échelle des Proportions.*

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The antæ of the *pronaos*, instead of being in a line with the columns, as is the case in ancient temples, are carried forward so as to give greater depth to the vestibule.

The great Temple of Neptune is probably the only one in the interior of which two orders of superimposed columns have been preserved; these are arranged as in the hypæthral temples, which were open over the central nave. This nave, however, seems to have been purely decorative, as was also the case in the Parthenon, for there was no corresponding gallery on the first floor. The columns of the lower range are four diameters high, or perhaps a little more; the ratio in the upper range is somewhat less.

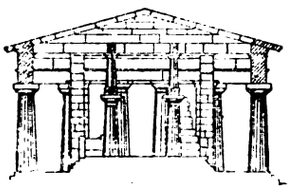

Fig. 2. Section of the Great Temple of Pæstum (6th century B. C.).

MM. Thomas and André discovered the altar before the temple, in 1848; it measured 27.63 feet by 8.69.

Henri Labrouste was of the opinion that this temple was wholly covered, while Thomas believed that he had proof that it was hypæthral, or open in the centre. In fact this question, like most questions of Greek antiquity, is left somewhat in doubt.

The ruins of the temples of Metapontum apparently take us back to the sixth century before our era; for details concerning them the reader is referred to the great work of M. A. de Luynes. The height of the columns is about $4\frac{2}{3}$ diameters.

Nothing apparently remains of this period in Asia Minor except the temple of Assos. On the island of Ægina, there are important ruins of a temple supposed to have been consecrated to Minerva; a complete study of these has been made by M. Charles Garnier. The temple had six columns in front and twelve on the sides; the *naos* was divided into three naves by a row of six columns on each side. The columns were $5\frac{1}{2}$ diameters high, nearly the proportions adopted later, when Greek art was at its zenith; in the temple of Theseus, at Athens, they were not over $5\frac{1}{2}$ diameters high. There were two superimposed orders in the interior, fragments of which have been discovered. A special interest attaches to the studies carried on here, as bits of colored stucco and of paintings have been brought to light, which have rendered it possible to reproduce the coloring used in Greek temples.

Such were the chief edifices, so far as known to us, which were reared in the early period of the beautiful architecture of Greece, from Pisistratus to Pericles.

[To be continued.]

PARIS CHURCHES. — IX.

ST. DENIS.

BRACKENHEIM. WURTEMBERG.

ALTHOUGH the Benedictine abbey church of St. Denis is some miles from Paris, it is so mixed up with the history of the capital, that it ought not to be omitted in the series of "Paris Churches." Moreover, as it is by far the finest church in, or near, the metropolis, and since its restoration one of the grandest examples of the thirteenth-century architecture in France, no one ought to grudge the tiresome journey by train or rail in order to see it, even if his stay in Paris be limited to a few days. The only thing required to make it perfect, is new stained-glass in the windows of the clerestory to replace that put up during the reign of Louis Philippe, a horrible example of the execrable taste of the period.

The legend of St. Denis, the patron of France, is exceedingly picturesque. By some ecclesiastical authorities he is said to have lived in the first century, by others in the second or fourth, but by most he is one and the same person as Dionysius the Areopagite. Hilduin, abbot of St. Denis at the beginning of the ninth century, seems to have had no doubt upon the subject, and in art the saint and the disciple of St. Paul have always been looked upon as one and the same persons, although tradition records the existence of another St. Denis, a bishop of Paris in the third century. Dionysius was an Athenian philosopher named Theosophus. Travelling in Egypt to study astrology with a companion named Apollophanes, they were surprised by a strange darkness that came over the heavens and were naturally much troubled thereby. Returning to Athens, Dionysius heard St. Paul preach, and thereupon he was converted to Christianity, and then he understood that the darkness which he had seen at Heliopolis, was none other than that which fell upon the earth for the space of three hours when the Blessed Redeemer was crucified. Baptized and ordained priest, Dionysius subsequently became bishop of Athens; and in some of the writings attributed to him he relates that he travelled to Jerusalem to see the Blessed Virgin, whom he found continually surrounded by a dazzling light, and attended by a company of angels. He also gives an account of her death at which he was present with certain of the Apostles. After this, he returned to Athens and subsequently he was present at St. Paul's martyrdom in Rome. Thence he was sent by St. Clement to preach the Gospel together with a priest named Rusticus and a deacon Eleutherius. Arrived at Paris, an exceeding great city full of people and provided with all the good things of the earth, they found it so attractive that it seemed to them another Athens and so they sojourned there teaching the people, who were learned in all things but the way of truth. St. Denis also sent missionaries into other parts of Gaul, and into Germany. But these successes were not pleasing unto Satan, and so he stirred up the nobles against the good bishop, and he was accused before the Emperor Trajan. Some say it was Domitian, but in either case the result was the the despatch of one Frescennius a pro-consul, from Rome, with orders to throw Denis and his companions into prison. This was done, and finding that they would not retract, they were put to death upon the Hill of Mercury (who was so much honored by the Gauls), and which was subsequently called Montmartre. Then a stupendous miracle took place. St. Denis not desiring, or not being permitted to become food for wolves, took up his decapitated head in his hands, and walked for the space of two miles, angels singing by the way. Accompanied by this celestial body-guard, the saint marched over the plains beyond the city, and signified in some way, unrecorded, that he desired burial where now stands the church dedicated to his memory. This was accomplished by a pious woman named Catulla, who had ministered unto the three blessed martyrs in their prison, and who now laid their mutilated remains in her own field.

Paris formerly, even as late as the last century, contained many spots sacred to the memory of St. Denis and his three companions. At Nôtre-Dame-des-Champs, a crypt used to be shown where they preached to their first disciples. At St. Benoit, now destroyed, was an oratory, on the wall of which was an inscription recording that St. Denis first invoked the name of the Most High on that spot. At St. Denis-de-la-Chartre, was the prison where the martyrs were visited by our Lord, and where He administered His Blessed Body and Blood to them. At St. Denis-du-Pas, was the spot where they suffered their first tortures; and upon Montmartre the church of St. Pierre records the spot upon which they were decapitated. The way across the plain from Montmartre to the place of burial was marked by a succession of crosses, and the field where the saint's remains were laid subsequently became the precincts of the famous abbey.

The first church is said to have been erected before the invasion of the Franks, but this had fallen into ruins in the fifth century, and it was through the piety of St. Genevieve and the people of Paris that it was rebuilt. St. Genevieve, like all good Parisians, held St. Denis in great esteem; and it was during a visit paid to his shrine that her taper, maliciously blown out by the arch-enemy, was successfully relighted through the fervor of her prayers.

But the magnificence with which Dagobert rebuilt and endowed the church, completely eclipsed the work of the maid of Nanterre; and so effectually was the king looked upon as the founder of the abbey, that, up to the dissolution of the monasteries, the monks celebrated his festival (January 19th) with great solemnity and splendor. It was about the year 630 that Dagobert undertook the rebuilding of the church, which is said to have been decorated with precious marbles, magnificent bronze doors, and gold and silver vessels enriched with precious stones. These latter, and the shrine of the saint, were the work of the famous artificer in metals, St. Eloy, who was also the maker of the shrines of St. Martin, St. Germain, and St. Genevieve. All these and in fact all this great smith's works (as far as is known) have perished; but his memory is still preserved by pictures and sculptures representing some of the legendary incidents of his life. In the Florence Academy is a picture by Botticelli, and at the church of Or San Michele is a statue and bas-relief, both of which represent one of the great events of the saint's life. A horse having been brought to him to be shod, the animal proved restive, and the saint being exercised in his mind as to how he should keep the beast still, bethought him of an excellent plan. He calmly cut off the leg, and placing it upon his anvil, fastened on the shoe, this done, he replaced the leg upon the horse, to the amazement of the beast and the edification of his owner. Another picture in Florence,

[1] Continued from No. 646, page 222.

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painted for the Company of Goldsmiths by Jacopo da Empoli, is curious, showing the saint arrayed as Benvenuto Cellini, presenting a shrine to King Dagobert, who figures in the costume of Francis I.

In 754, Pepin and his queen Berthe, after being anointed at St. Denis by Pope Stephen II, began the reconstruction of the church which Charlemagne finished and dedicated in 775. From that date until the twelfth century, little is known of the history of the abbey. Like all the churches and monasteries in the north of France, it was probably destroyed, and its land laid waste by the invasions of the Northmen and the disastrous civil wars which characterized the end of the Carlovingian dynasty. But it may be the fact, as asserted by some authorities, that a part of the crypt, a few columns, and some marble capitals belong to the eleventh century.

The third, and present church, was begun by the great Abbot Suger, and is considered by many French architects to have been the earliest specimen of the Gothic style. Suger erected the tower, the portals, the choir and the nave; he filled the windows with stained-glass and loaded the shrines and the ornaments with precious stones. Some of the sacred vessels formerly belonging to his church are now in the Louvre (in the Salle d'Appollon) and testify to the artistic feeling as well as to the religious enthusiasm of the good abbot. "As it is our duty to present unto God oblations of gems and of gold, I, Suger, offer this vase unto the Lord" is the inscription upon an antique sardonyx amphora which he converted into a vessel for the altar. The dedication of this church took place twice, in 1140 and 1144; but in 1219 and again in 1230, parts of it were destroyed by fire. In the following year, 1231, Abbot Eudes Clement commenced the reconstruction, which was continued by his third successor, Mathieu de Vendôme. Some of the chapels of the north aisle were built in the fourteenth century. A portion of the famous Valois Chapel which was erected by Henry II and Catherine de' Medicis, and afterwards destroyed under the regency of Philippe d'Orléans, still exists in the shape of a sham ruin in the Parc Monceau.

It is generally supposed that the destruction of churches and the despoiling of monasteries, were the work of the enemies of religion in the form of the "people." But kings and emperors did not hesitate to rob the church when they could drain no more money out of their suffering subjects. To Francis I and Louis XIV, the eighth commandment was no more binding upon kings than the seventh, laws were made for the vulgar herd; and so, when the "Grand Monarque" saw fit to please Mme. de Maintenon by founding St. Cyr, he suppressed the abbey of St. Denis, and relieved the monastery of the abbot's revenues.

Many of the seventy-three abbots, from Dodon the first (who lived in 637), to the last, the Cardinal de Retz, were distinguished men. Amongst them were Hilduin, Suger, Mathieu de Vendôme; the Kings Eudes, Robert and Hugues Capet; and the cardinals, de Bourbon, de Lorraine, de Guise and Mazarin. The conventual buildings were all destroyed in the reign of Louis XV, and during the Revolution the church suffered in the same way as Nôtre Dame by being "secularized" in the most revolting manner. But if the Revolutionists destroyed or carried away monuments, the Imperial architects did worse, for they began a restoration in their own hideous taste and "style"; and it was not until a few years ago that the old church was restored to its pristine grandeur.

Perhaps few churches have seen more vicissitudes than the silent walls of St. Denis have witnessed. The burial place of most of the kings of France, it was also upon its high altar that Louis le Gros deposited the oriflamme, the famous standard of France; while some seven centuries later its tombs were only saved from utter destruction through the wit of Alexandre Lenoir, who declared them to be objects of artistic merit and therefore worthy of retention in a national museum. Even the church itself was threatened with destruction and was only saved by an architect seriously suggesting that it should be turned into a market, the side-chapels forming shops.

The façade has three doorways which are rich in sculptures representing the Last Judgment and the life of St. Denis. Some statues on one of the other doorways are curious examples of how a fraud may be perpetuated. They represent, without doubt, some members of the royal house of David; but at some period they were said to be kings of the Capetian line, and as such, casts were taken of them and sent to Versailles, where they figure as portrait statues of Hugues Capet, Robert, Henri, Philippe, Louis VI and Louis VII.

On each side of the western rose-window are some bands of black and white marble after the manner of the churches of Pisa and Genoa, souvenirs probably of Suger's travels in Italy. Indeed, he tells us in the account of his administration, that he took much trouble in preserving a mosaic which he had brought home and placed in the tympanum of one of the doors. This was unfortunately replaced in 1774 by a bas-relief of the meanest workmanship.

The interior of the church consists of a nave and two aisles, with a chêvet of seven chapels at the east end, considerably raised above the level of the nave. Access to these chapels is gained by a flight of steps on each side of the high altar, and under them is the royal crypt. The whole of the east end of the church, the double aisles with their single shaft columns, the chapels, the vaulting and the glass is one mass of color and forms a most beautiful *coup d'oeil*; indeed there is but one eye-sore in the whole building — the aforesaid series of windows representing Louis Philippe's heroic deeds. Blue swallow-tailed coats and white trousers scarcely form a costume which is either effective or appropriate in designs for church windows.

The wood-carving of the stalls is of the fifteenth century and was brought from the abbey of St. Lucien-lez-Beauvais; while the inlaid marquetry work at the backs of the seats is from the château de Gaillon, built by Cardinal d'Amboise. Many of the *misereres* have the usual quaint conceits which one sees everywhere. Portions of the old glass were preserved by Lenoir in the museum of the Petits-Augustins during the stormy period, and were afterwards replaced in the windows of the apse; upon some of these, inscriptions by Suger, explanatory of the designs, may still be read.

Of the early kings of France, Dagobert was the first to be buried at St. Denis, and his memorial tomb (much restored) still stands on the right of the high altar. From Hugues Capet to Louis XV, most of the sovereigns were interred there; but it must be borne in mind that almost all the early tombs are modern, either wholly or in part. In the thirteenth century the strange custom came into fashion of dividing the bodies of royal personages, and burying the parts in different places. The Benedictine monks of St. Denis protested against this division of valuable property, asserting their right to possess the entire remains of the kings; but the Dominicans and the Cordeliers contested these claims, and subsequently gained permission for their own churches to share in the spoil. Later on, other religious orders obtained the same privileges; and the ladies of Val-de-Grâce were distinguished by the possession of the hearts of nearly all the royal princes and princesses from Anne of Austria, the founder of the monastery. Naturally, when each defunct sovereign was divided into three portions — the body, the heart, and the entrails — great opportunities were afforded to architects and sculptors; and we thus find three marble monuments with recumbent figures erected for the remains of Charles V, that at St. Denis containing his body, while Rouen and Maubuisson respectively possessed his heart and his intestines. Francis I's heart was placed in an exquisite vase in the church of the nuns of Haute-Bruyère; while his body was buried in the grand monument at St. Denis. The vase was the work of Pierre Bontems and is now in the same chapel as the tomb, which was the joint work of Philibert Delorme and Bontems. The beautiful group of the "Three Graces" by Germain Pilon, now in the Renaissance museum of the Louvre, was intended to support a vase containing the heart of Henry II.

None of the monuments of the early kings are anterior to the thirteenth century, consequently, even the original portions of the effigies which remain, cannot be looked upon as in the slightest degree portrait statues. On the other hand, the magnificent tombs in bronze and the brasses which adorned them, erected to the memory of Philippe Auguste, St. Louis and his father, and which were destroyed centuries ago, were most probably as valuable as contemporary portraits as they were for their workmanship. The last tomb erected was that of Henry II; the sovereigns who followed him having no memorials. They were laid together in one great crypt, and when disturbed by the Revolutionists for the sake of the lead of their coffins ("of the coffins of our old tyrants, let us make bullets to hurl at our enemies,") there were fifty-four bodies arranged upon iron trestles side by side, Henry IV heading the list and the elder Dauphin, son of Louis XVI, being the last. Amongst the distinguished men buried at St. Denis, were the following:

Pierre Chambellan, of whom Joinville writes, "*Messire Pierre Chambellan fut le plus loial homme et le plus droicturier que je veisse oncques en la maison du roi . . . . l'homme du monde en qui le roy croirit plus*"; and Alphonse, son of Jean de Brienne, King of Jerusalem and uncle of St. Louis, whose epitaph designates him as "*moult saige et moult loial chevaliers.*" Both of them died "*au service de Dieu et de Monsieur Loys, roy de France, dessous Cartaige l'an de l'incarnation de Nostre-Seigneur MCCLXX,*" and were "*enterrés en l'église Monsieur Saint Denis*" in the year MCCLXXI, "*le vendredi devant la Penthecoste, le jour et l'heure quand Monsieur le roy Loys fut enterré*"; indeed, the old chronicler says, "*aus pieds du bon roys tout en la manière qu'il gisoit à ses pieds quand il estoit en vie.*"

Close to the tomb of Charles V were those of Duguesclin, Louis de Sancerre, Bureau de la Riviére, Arnaud de Guilhem seigneur de Barbazan, who, before Bayard, was called *le chevalier sans reproche*, and who with six others, was victorious over seven English knights in 1404. During the reign of Louis XIV, the duc de Châtillon, the marquis de Saint-Maigrin, and Turenne were buried at St. Denis. The only civilian thus honored was Jean Pastourel, one of the principal counsellors of Charles V.

If due allowance be made for copious restorations, the history of monumental art may be well studied at St. Denis. The memorial tomb of Dagobert who died in 638 is a fine specimen of thirteenth-century work. It is a canopied tomb with scenes from the "*Gesta Dagoberti*," in three zones under a pointed arch; below these, is the recumbent figure of the king. The legendary history is too long to relate, but one incident in it is the tormenting of his soul by demons, and his supplications to St. Martin, St. Denis and St. Maurice, who rushed to the aid of their "*bon amy le roy*," or as the text of Montfaucon puts it, "*L'ame de Dagobert est delivrée par les merites de Sainct Denis, Sainct Martin et Sainct Maurice.*" These bas-reliefs are all well worth minute study. The two enamelled brasses of the children of St. Louis were brought to St. Denis from the abbey church of Royaumont in 1791. The figures are in relief upon a ground encrusted in enamel; the heads and hands, the lions at the feet, and

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the angels swinging censers are of polished brass; while the feet and the draperies are in colored enamel. To see these brasses, permission must be obtained from the architect of the church, as they are upon one side of the High Altar, a part which is never shown to ordinary visitors. M. de Guilhermy places the date of the mosaic effigy of Frédégonde as not earlier than the twelfth century. It is composed of a stone slab of the form of the early stone coffins. The design is marked out by thin bands of metal between which are incrustations of very small pieces of porphyry, serpentine, and white marble. This, like several of the early tombs, was originally in the abbey of St. Germain-des-Près. The tombs of Philippe, brother of St. Louis, and of Louis, the saint's eldest son, were also originally at Royaumont. They are in stone, colored, the figures resting on a slab supported by canopied niches. Within the latter are small figures of bishops, monks and angels. On the tomb of Louis, the background of these figures is of blue enamel. The tomb of Louis d' Orléans and Valentine de Milan forms part of the magnificent mausoleum erected by Louis XII, in the church of the Célestins, Paris. It stood in the centre of the chapelle d' Orléans, and was surrounded by various sculptures, many of which are now in the Louvre: the statue of Philippe de Chabot by Jean Cousin, the "Three Graces" by Germain Pilon, the column of Louis de Brissac by Etienne Lehongre, and of Anne de Montmorency by Barthélemy Prieur, the "Genii" by Jean Cousin, and some sepulchral monuments of the de Longuevilles. The beautiful column of Francis II, now at St. Denis, was also in the chapel and is attributed to Germain Pilon. The tomb of Louis XII and Anne de Bretagne, is one of the finest specimens of French Renaissance. It was the work of the brothers Jean and Antoine Juste of Tours, the authors of the exquisite tomb of the children of Charles VIII in the cathedral of that city, and was erected about 1530-50. It is composed of a square base enriched with bas-reliefs representing battle-scenes, and upon this rises a sort of a chapel with arcaded sides, through which are seen the naked figures of the the king and queen in the agony of death. Above this on the top of the canopy are their effigies clad in regal attire, kneeling upon cushions before two prayer desks. At the four corners of the base are statues of the Cardinal Virtues, while upon the stylobate which support the pilasters of the arcade are figures of the Twelve Apostles. From the style of some of the sculptures, this tomb was long considered to be the work of an Italian, the treatment of landscape upon the bas-relief being similar to that upon the great Ghiberti gates at Florence. But of late years it has been established beyond doubt that the sculptor was Juste of Tours, and that the Italian character of his work, was the result of his travels, for on one of his works in the cathedral of Dol, he has signed himself *magister Johannis cujus cognomen est Justus et Florentinus.*

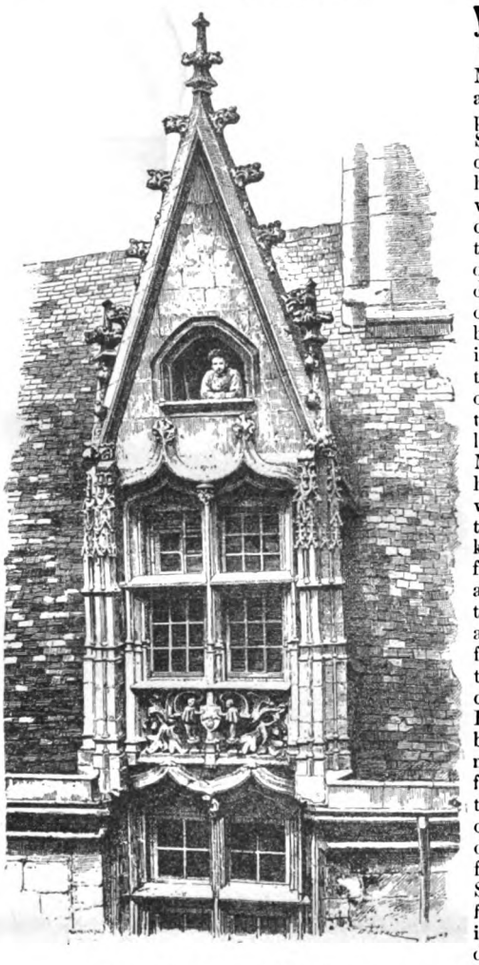
The tomb of Henry II and Catherine de' Medici, is the work of Germain Pilon (1535-90) and it was constructed for the Valois chapel erected by Philibert Delorme on the east side of the north transept. It is a large structure consisting of a base, upon which rests twelve composite columns for the support of the canopy. At each end are openings through which are to be seen the figures of the defunct in the sleep of death. The terrible side of death which is prominent in the expression on the faces of Louis XII and his queen, is here absent; and Catherine is represented young and beautiful as she appeared at the death of her husband, whom she survived thirty years. At the four corners are bronze figures of the Cardinal Virtues, and kneeling figures of the sovereigns upon the canopy are also in bronze. The bas-relief upon the stylobate represent Faith, Hope, Charity, and good works. Sauval in his "*Antiquités de Paris*," relates that "*le cavalier Bernin, a admiré le tombeau des Valois, qui voulait ne rien trouver de passable en France*," and it is said that when the monument was reconstructed, it was found that many of the marbles had been the remains of Classic times and that they had retained some traces of antique designs on their reverse sides.

The monument of Francis I and Claude de France is the largest of these splendid tombs. It was erected about 1552 by Philibert Delorme with the assistance of several sculptors. Pierre Bontems was the author of the bas-reliefs upon the stylobate, and some of the kneeling figures upon the canopy; Germain Pilon sculptured the eight statues of Fortune, allegorical figures of children under the canopy; and Ambroise Perret, the Four Evangelists; while the details of ornament were the work of Jacques Chantrel, Bastien Galles, Pierre Bigoigne and Jean de Bourges. The recumbent figures have been attributed to Jean Goujon, from the exceptional beauty of the workmanship, but without any positive proof. The tomb is of white marble, with a little black and gray introduced for some of the mouldings; the bas-reliefs represent the king's campaigns in Italy. In the bas-reliefs of the Louis XII's monument many of the costumes are more Roman than French; but those of the personages on Francis I's are treated with more historical truth. The faces of the recumbent statues are beautifully modelled; that of the queen bearing an expression of the sanctity with which she was accredited:

"*La reine Claude, décéda en l'an* 1524, *âgée de* 25 *ans, en grande opinion de sainteté; car Nicolas Gilles, qui vivoit alors, escrit en son histoire de France, qu'on faisoit des voeu, et qu'on offroit des chandelles à son cercueil, tandis qu'il fût à Blois où elle mourut, et qu'il se trouva des personnes qui affirmèrent avoir esté quéries de quelques maladies par son intercession*" (Germain Millet).

Unfortunately, some vandals have defaced these marbles by the stupid scribbling of their insignificant names; one is cut right across the queen's face. Five figures kneel upon the canopy, the king and queen, the dauphin Francis and Charles, duc d'Orléans, and their daughter Charlotte. The *prie-Dieux* in front of Francis and Claude are ornamented with an F and a C. This, like the other tombs, was carried off to Paris in 1792; and the inscription of Lenoir, stating that he reconstructed it in the musuem of the Petits-Augustins in the year VI of the Republic, still remains upon the back of it. Its restoration at St. Denis, occupied six years, much of the work being re-carved. The present restoration of the church, including the placing of the monuments in their original position, is the work of Viollet-le-Duc, a work which was scarcely finished when the Franco-German war broke out, causing still further mutilation to the exterior. During the last 150 years the church has been the constant prey of iconoclasts and restorers; from which it has suffered most, its relentless enemies or its false friends, it is difficult to say. But in Viollet-le-Duc it found a devoted lover, who effaced alike all traces of Revolutionary tribunals, Napoléonic architects and Prussian shells; and who restored it to the exquisite beauty of its youth, when St. Louis and his companions were laid to their rest before its high altar.

THE BUREAU OF ETHNOLOGY'S FIFTH ANNUAL REPORT.[1] — III.



XVth Century Dormer at Dijon, France.

THE Rev. Dr. Clay MacCauley of Minneapolis, has an interesting paper on the Seminole Indians of Florida, whom he visited in the winter of '80–81, commissioned by the Bureau to inquire into their condition and ascertain their number. Of course, in so short a time there was little opportunity for thorough ethnological work, but Mr. MacCauley has done his work conscientiously, and acknowledging frankly his limitations, he submits the report more as a guide for future investigations than as a completed result. He has, however, brought to light many important facts concerning this fragment of a once powerful Indian nation which fought the United States authority for seven years in one of the most disastrous and costly of all the wars waged with the native races, costing over $30,000,000 and 3,000 lives, while probably not over 400 Seminole warriors were engaged; the inaccessible character of the country, with its impenetrable swamps, having given them a great advantage over the invaders. The few remaining in Florida after the removal of the majority to the Indian territory have lived in extreme isolation, and Mr. MacCauley's is the first successful attempt to ascertain their true numbers and condition. Major Powell comments: "The status of these Indians is peculiar in that their contact with civilization has hitherto been regulated, to an extent not known elsewhere, by their own volition, and has not been imposed upon them. Visitors, traders and government agents have been denied admission, but the Indians have in a limited way visited the settlements beyond their own boundaries and traded there. The result has been a remarkably prosperous condition in agriculture and domestic industries. This is not to be attributed wholly to the favorable character of their soil and climate, as under similar environment many people are lazy and improvident, whereas the Seminoles

[1] Continued from page 24, No. 746. The Rev. Clay MacCauley on the Florida Seminoles. — Mrs. Stevenson on Zuñi Children.

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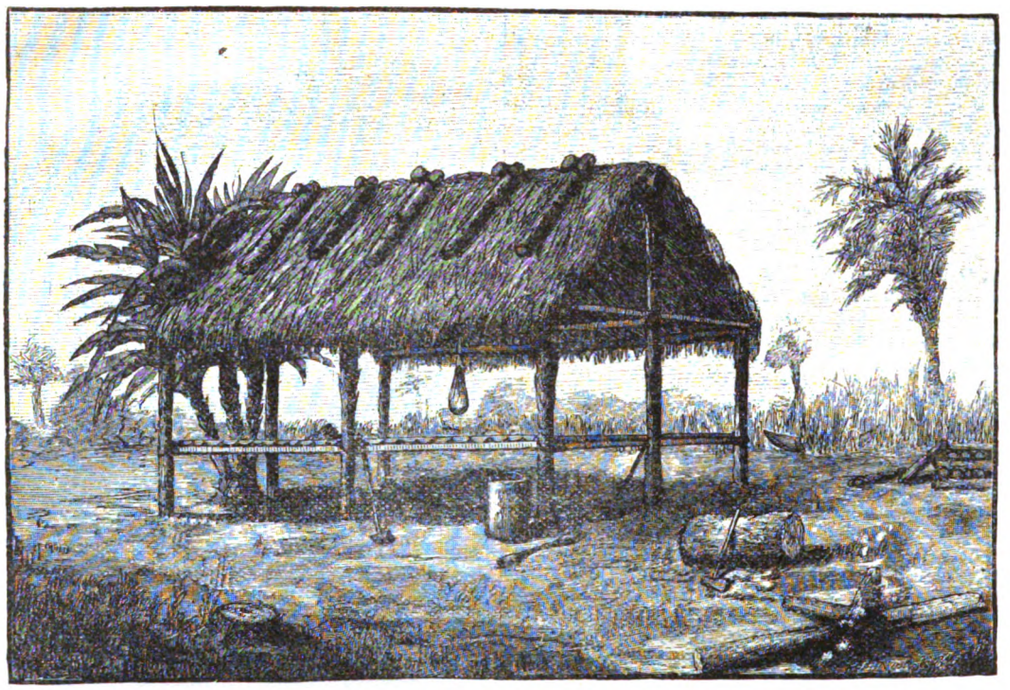
of Florida are industrious and frugal. That they have advanced in culture during the last generation is doubtless true, but it is a common and pernicious error to consider the Indian tribes at the time of the Columbian discovery as wholly without knowledge of agriculture, depending solely on the chase, fishing, and the spontaneous products of the earth. This error is a part of the feræ naturæ theory which has been so baneful in the past consideration of the aboriginal inhabitants. No radical change was necessary for the greater portion of the Indian tribes to become self-supporting by the industries classed as civilized, provided that their treatment had been rational and in accordance with the slow but certain operations of nature. Throughout the continent generally, the pressure of the white settlers did not allow of the necessary delay, but here it was obtained. The advance of the Seminole has been practically without European instruction; their progress towards civilization has been their own work in the orderly course of evolution, and therefore instructive."

The total number of the Seminoles in Florida in 1880 was only 208, constituting 37 families, living in 22 camps which were gathered into five widely separated groups, or settlements. It is strange that although they are polygamous there is an excess of males over females, and while they are increasing in number there are more boys born than girls. Mr. MacCauley describes the personal and social characteristics of the Seminoles simply and unpretentiously. Physically they are an exceptionally fine race, as is apt to be the case with a natural people whose environment is such as to afford them abundant and healthful nutrition, with a climate that permits free and symmetrical development of the body, unencumbered by heavy and constraining garments.

The description of the Seminole dwellings will particularly interest readers of the *American Architect*. These Indians are not nomads, and indeed, the nomadic character of the Indians in general has been much exaggerated. The Seminoles have fixed habitations, settlements in well-defined districts, permanent camps, houses or wigwams, which remain from year to year the abiding-places of their families, and gardens and fields which for indefinite periods are used by the same owners: "As one Seminole home is, with but few unimportant differences like nearly all the others, we can get a good idea of what it is by describing here the first one I visited, that of I-ful-lo-ha-tco, or Charlie Osceola, in the 'bad country' on the edge of the Big Cypress Swamp. When my guide pointed out to me the locality where 'Charlie' lives, I could see nothing but a wide saw-grass marsh surrounding a small island. The island seemed covered with a dense growth of palmetto and other trees and tangled shrubbery, with a few banana plants rising among them. No sign of human habitation was visible. This invisibility of a Seminole's house from the vicinity may be taken as a marked characteristic of his home. If possible, he hides his house, placing it on an island and in a jungle. As we neared the hummock we found that approach to it was difficult. On horseback there was no trouble in getting through the water and annoying saw-grass, but I found it difficult to reach the island with my vehicle, which was loaded with our provisions and myself. On the shore of 'Charlie's' island is a piece of rich land of probably two acres in extent. At length I landed, and soon, to my surprise, entered a small neat clearing, around which were built three houses, excellent of their kind, and one insignificant structure. Beyond these, well fenced with palmetto logs, lay a small garden. No one of the entire household — father, mother and child — was at home. Where they had gone we did not learn until later. We found them next day at a syrup-making at 'Old Tommy's' field, six miles away. Having, in the absence of the owner, a free range of the camp, I busied myself in noting what was left in it and what were its peculiarities. Among the first things I picked up was a 'cow's horn.' This, my guide informed me, was used in calling from camp to camp. Mounting a pile of logs, Billy tried with it to summon Charlie, thinking he might be somewhere near. Meanwhile, I continued my search. I noticed some terrapin-shells laying on a platform in one house, the breast-shell pierced with two holes. 'Wear them at Green Corn Dance,' said Billy. . . . Dwellings throughout the Seminole district are practically uniform in construction. With but slight variations, the accompanying sketch of I-ful-lo-ha-tco's main dwelling shows what style of architecture prevails in the Florida Everglades. This house is approximately 16 by 9 feet in ground measurement, made almost altogether, if not wholly, of materials taken from the palmetto tree. It is actually but a platform elevated about three feet from the ground and covered with a palmetto thatched roof, the roof being not more than 12 feet above the ground at the ridge-pole, or 7 at the eaves. Eight upright palmetto logs unsplit and undressed, support the roof. Many rafters sustain the palmetto thatching. The platform is composed of split palmetto logs lying transversely, flat sides up, upon beams which extend the length of the building and are lashed to the uprights by palmetto ropes, thongs or trader's ropes. This platform is peculiar, in that it fills the interior of the building like a floor and serves to furnish the family with a dry sitting or lying-down place, when, as often happens, the whole region is under water. The thatching of the roof is quite a work of art: inside, the compactness and regularity of the laying of the leaves display much skill and taste on the part of the builder; outside — with the outer layers there seems to have been less care taken than with those within — the mass of leaves of which the roof is composed is held in place and made firm by heavy logs, which, bound together in pairs, are laid upon it astride the ridge. The covering is, I was informed, water-tight and durable and will resist even a violent wind. Only hurricanes can tear it off, and these are so infrequent in Southern Florida that no attempt is made to provide against them.



A Seminole Dwelling.

"The Seminole house is open on all sides and without rooms. It is, in fact, only a covered platform. The single equivalent for a room in it is the space above the joists which are extended across the building at the lower edge of the roof. In this are placed surplus food and general household effects out of use from time to time. Household utensils are usually suspended from the uprights of the building and from pronged sticks driven into the ground near by at convenient places. From this description the Seminole house may seem a poor kind of a structure to use as a dwelling; yet if we take into account the climate of Southern Florida nothing more would seem to be necessary. A shelter from the hot sun and the frequent rains, and a dry floor above the damp or water-covered ground, are sufficient for the Florida Indian's needs. I-ful-lo-ha-tco's three houses are placed at three corners of an oblong clearing, which is perhaps 40 by 30 feet. At the fourth corner is the entrance into

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the garden, which is in shape an ellipse, the longer diameter being about 25 feet. The three houses are alike, with the exception that in one of them the elevated platform is only half the size of those of the others. This difference seems to have been made on account of the camp-fire. The fire usually burns in the space around which the buildings stand. During the wet season, however, it is moved into the sheltered floor in the building having the half-platform. At Tus-ko-ha's camp, where several families are gathered, I noticed one building without the interior platform. This was probably the wet-weather kitchen. To all appearance there is no privacy in these open houses. The only means by which it seems to be secured is by suspending, over where one sleeps, a canopy of thin cotton cloth or calico, made square or oblong in shape, and nearly three feet in height. This serves a double use, as a private room and as a protection against gnats and mosquitoes. But while I-ful-lo-ha-tco's house is a fair example of the kind of dwelling in use throughout the tribe, I may not pass unnoticed some innovations which have lately been made upon the general style. There are, I understand, five inclosed houses, which were built and are owned by Florida Indians. Four of these are covered with split cypress planks or slabs; one is constructed of logs. Progressive 'Key West Billy' has gone further than any other one, excepting perhaps Me-le, in the white man's ways of house-building. He has erected for his family, which consists of one wife and three children, a cypress-board house, and furnished it with doors and windows, partitions, floors and ceiling. In the house are one upper and one or two lower rooms. Outside, he has a stairway to the upper floor, and from the upper floor a balcony. He possesses also an elevated bed, a trunk for his clothing and a straw hat." It might have been added that in such a climate, "progress" of this sort will be likely to result in physical degeneracy, for probably nothing could be more unhealthy in the shape of a dwelling for a hot climate than a close board house, which must exclude the fresh air while it retains the heat like an oven.

It is striking how the facility of trading with the whites has extinguished some of the native arts; pottery-making and the use of stone implements have entirely ceased, and their word for stone, "*tcat-to*," has been applied to iron. They also weave cloth no longer, but are still basket-makers in a small way. The palmetto is of the greatest value to them. "From the trunk of the tree the frames and platforms of their houses are made; the tough fibre which lies between the stems of the leaves and the bark furnishes them with material from which they make twine and rope of great strength, and from which they could, if necessary, weave cloth for clothing; the tender new growth at the top of the tree is a very nutritious and palatable article of food to be eaten either raw or baked; its taste is somewhat like that of the chestnut; its texture is crisp like that of our celery stalk."

In marked contrast to Mr. MacCauley's article, with its unassuming narration of his observations during three months, or so, among the Seminoles, is Mrs. Tilly E. Stevenson's paper called the "Religious Life of the Zuñi Child." It is not too much to say that the latter is one of the most worthless contributions ever made to American ethnology, and it is unfortunate that it should have been given the prominence of a place in the publications of the Bureau, where it cannot fail to be misleading. Mrs. Stevenson had the advantage of accompanying her husband, the late Colonel James Stevenson, one of the most esteemed officials of the Bureau, on his frequent collecting trips in the Southwest, and since 1878 has spent a portion of each season at Zuñi. The result shows, however, that the greatest industry and persistence are of slight account without the scientific habit of mind; the faculty of correct observation and correlation of facts. This faculty does not appear to be possessed by Mrs. Stevenson in the slightest degree. Her method is that of the *chiffonier*, and the result is an ethnological scrap-bag. The article so teems with misstatements and inaccuracies that it is useless to attempt to indicate them. It is not too much to say that it is a scientific impertinence to enter upon the most thoroughly studied ethnological field in America and gravely make assertions that contradict the researches of the foremost investigator we have; assertions that could easily be proven ridiculously incorrect. The only value of the article is as an example of how ethnological work should not be done; but one example of the kind is amply sufficient.

SYLVESTER BAXTER.

WOODS THAT SINK IN WATER. — There are 413 species of trees found within the limits of the United States and territories, sixteen of which, when perfectly seasoned, will sink in water. The heaviest of these is the black ironwood (Condalia ferrea), found only in southern Florida, which is more than thirty per cent heavier than water. Of the other fifteen, the best known is the lignum vitæ (Guaiacum sanctum) and the mangrove (rhizophora mangle). Texas and New Mexico, lands full of queer creeping, crawling, walking, and inanimate things, are the homes of a species of oak (quercus grisea) which is about one and one-fourth times heavier than water, and which, when green, will sink almost as quick as a bar of iron. It grows only in mountain regions, and has been found westward as far as the Colorado desert, where it grows at an elevation of 10,000 feet. All the species heavier than water belong to tropical Florida, or in the arid west and southwest. — *Commercial Advertiser.*

SLAUGHTER-HOUSES AT MUNICH.

ANOTHER building, or rather a group of buildings, for a less æsthetic but of as praiseworthy a purpose as the Glyptothek, which, by reason of the grand scale upon which it is planned attracts the attention of the visitor, is the city slaughter-house. A description of this establishment, erected some twelve years ago, may perhaps be of some interest, as I am not aware that any of our American cities possess any such consolidated slaughter-houses as are to be found in almost all cities on the Continent, or, that there is in any State in America, a law in existence prohibiting the killing of animals for food at any places other than those provided by the Government.

The more particular reasons which led in this instance, and which have led to the construction of similar establishments, may be enumerated as follows:[1] In the first place, such a state of affairs as had existed previous to the erection of the city establishment rendered the proper examination of the beasts before killing and of their flesh after death by a staff of medical experts, and of the houses and their surroundings by sanitary experts, to a measure impossible, or at least increased the attending difficulties to a maximum, whereas by such means as have been adopted the necessary supervision could be perfect and the difficulties reduced to a minimum. Thus consumers had no longer to fear unscrupulous dealers, everywhere to be found, who, for the sake of a small additional gain are willing to endanger or even sacrifice the lives of their customers by selling them foul meat or the flesh of diseased stock, the disease germs of which are readily taken up by the human system, there propagated, and often lead to such dire results as the well-known cases of trichinæ poisoning. Also, from the lack of proper supervision the slaughter-houses about the city were sometimes found to be poorly drained and ventilated, and in a most filthy state, much to the disgust of the property-holders and those unfortunate enough to reside in the vicinity of such places. Thus, for sanitary reasons, the consolidation and the keeping of these houses outside of the city-limits was much to be desired. Not to mention the fact that the disagreeable, though then necessary, practice of driving herds of cattle through the streets, disturbing the traffic and adding much to the already difficult task of keeping the streets clean, could then be abandoned. A secondary reason, and one of sentiment, was the wish to keep from the eyes of the public, as much as possible, such scenes as are enacted in places of this description. This was all the more a consideration, inasmuch as it was thought that such sights can but have an unwholesome effect on the minds of the throng of children which is always sure to gather around such places, prompted by morbid curiosity.

In the Munich slaughter-houses and stock-yards we see combined the good points of a number of establishments; the result of a study made by the Board of Commissioners of the houses at Milan, Genoa, Turin, Geneva, Zurich, Basle, Stuttgart, Berlin, Dresden, Vienna and Buda-Pest.

A lot was chosen answering the following requirements: in close proximity to the railroads in order that branch-lines, decreasing the difficulty of transportation could easily be constructed, out of the city-limits yet within easy reach, and so located that the usually prevailing winds would blow the gases and odors which sometimes arise from such places rather away than towards the city. Sanitary specialists held, however, that if the establishment was properly constructed this was a matter worthy of little, if any, consideration. Also, in a position so that the large water-supply which would be necessary could easily be obtained, and, at the same time, offering unusually good facilities for disposing of the sewage.

The plans were prepared by the city architect; before, however, they were finally accepted, they were on public exhibition for some time, and the members of the trade mostly interested and affected by this movement invited to send to the authorities suggestions for improvements and alterations, which were duly weighed and considered, and if found of merit, accepted. From this fact, as well as from the fact that great pains were taken in collecting information and by profiting from the experience of other cities, one may well conclude that these houses are specimens of this class of architecture possessing an unusual degree of perfection.

The establishment is divided into two distinct parts — the stock-yards and the *abattoir*. These two divisions, both surrounded by brick walls eight feet high, are separated by a road 95 feet wide; access to them can only be obtained through the main gates adjacent to the offices of the superintendents. For the former division an appropriation of $412,000 was made, and for the latter, one of

[1] Taken from the Architect's Report and the Report of the Board of Commissioners.

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$594,000, thus the total appropriation amounted to over $1,000,000; the actual cost, however, exceeded this sum by about $10,000. For the grounds a territory containing some 135,875 square yards was purchased, of which about 44,432 square yards are under roof. The buildings throughout are of brick and of the simplest construction possible. The only ones which can lay claim to any decorative features are the two buildings respectively containing the restaurant and exchange, and the one containing the offices of the inspector.

The *abattoirs*, the buildings where the actual killing is carried on, six in number, are one-storied, rectangular structures, three of which are devoted to slaughtering of large cattle, two for sheep and one for hogs. These buildings are divided into stalls, an arrangement which has been adopted in some cities where each individual has his own private apartment, but the killing takes place in one large hall, divided, to be sure, by low partitions into divisions, which are entirely open on one side. The former arrangement was rejected as impractical, because of the large number of butchers who had to be accommodated. The arrangement here, also, possesses the additional advantage that inspection is much facilitated. It is also desirable that the carcass should be allowed to hang a few days before being taken down and cut into its various parts, for, by thus hanging, the flesh becomes of a fresh, rosy color, and the fatty substances of a whiteness much desired. It will be seen that this practice can more readily be permitted in large halls, continually swept by fresh currents of air, than in small and perhaps illy-ventilated stalls. The general arrangement also differs from that in vogue in other cities in another particular, namely, in that the courts between the buildings are not covered. But the result which is desired by roofing these spaces is obtained, without the attending difficulties of ventilation, by allowing the roof of the house to project some ten feet beyond the walls. When occasionally the houses are in an overcrowded state, the space under the projecting roofs, which is divided by iron fencing into compartments, can be used for killing. But the original use, for which it was intended, was to afford room in which the beasts might be kept immediately before being taken inside. Therefore, each interior stall is connected with the corresponding exterior one by a small door.

Parallel to the buildings just spoken of is another one, in which are the departments for the killing of diseased stock and horses, and quite isolated, yet within easy reach, is an octagonal building, where are to be found the various appliances for the cleaning and scraping of the hides, entrails, etc.

The three buildings in which large cattle only are slaughtered are rectangular structures, 50 x 140 feet, divided by central passages 12 feet wide, thus leaving the depth of stalls 19 feet. The ceilings, which are vaulted and about 20 feet high, are supported on two rows of cast-iron columns, resting on granite blocks and I-beams. Vent-pipes inserted in the hip of the roof, containing gas-jets at regular intervals, allow the foul air to pass from the interior. The floors of the main apartments are also vaulted, the arches being segmental, and springing from I-beams supported on the two rows of cellar columns. On the layer of asphalt with which the arches are first covered is the concrete filling upon which the floor proper, consisting of granite blocks, six inches thick, laid in cement, is put. The pulleys and ropes, with which the beast is lifted from the floor and held, arranged in alternate rows, are supported from the beams overhead, as also are the iron hooks, sliding in tracks, upon which the carcass may either be hung and pushed along the whole length of the building, and placed in the carts provided for the purpose, or to the storage-rooms. In each stall there is ample water-supply from two faucets, one-and-three-quarter-inch nozzles. The supply-pipes are all exposed, and of wrought-iron lined with asphalt and painted on the outside. Each division is lighted by one window, some distance from the floor, provided with corrugated-iron shutters, with movable slats for ventilation. Several lockers are built in the wall under each window. Fresh-air openings are also to be found immediately under the sills. Because of these and the frequently-occurring vent-stacks the ventilation has been so satisfactory that the cooling-rooms in the cellar have not been resorted to, even on the hottest days. The waste-water is taken up by the gutter in the centre of the hall, towards which the floor on both sides inclines, and, after passing through several catch-basins, so arranged that they can easily be removed and emptied, is delivered to the sewer. Nothing more remains to be said excepting that all apartments are lighted with gas, and also that the upper part of the walls and the ceilings are whitewashed, while the walls to a height of seven feet above the floor are covered with a thin coating of Portland cement, which is renewed annually.

The houses for the killing of the sheep and calves are much of the general appearance and construction of the ones just described, and differ only in the fact that the floors are of a somewhat lighter construction. Thus the granite floor of the other houses is replaced by a tile floor. The gutter in the centre of the hall, however, is of granite.

The interior arrangement of the house devoted to the killing of hogs, for which the one at Milan was taken as a model, varies somewhat from those just described. The centre-aisle is wider — 27 feet — for the purpose of accommodating the vats for cleaning the pork, and also the marble-top tables resting on iron legs, where the hides, feet, etc., are cleaned and scraped. These vats, four in number, and 6 feet 6 inches in diameter, are capable of holding from six to eight hogs at a time. This operation takes five minutes; therefore, between four and five hundred (the daily average) can easily be cleaned in four or five hours. The vats are composed of two shells — an outer one of cast-iron and an inner one of copper — which are placed some inches apart, so that steam may be conducted into the intervening space. Steam is also forced directly into the water, which in this manner is heated to the proper degree.

The next building to be considered is the one for the killing of diseased animals. This building is necessarily isolated and separated by a wall from the main yard, from which, nevertheless, it is of easy access. It is of such a size that seven horses and sixteen head of cattle can be killed at a time; adjacent to it are also the rooms for the examining of the meat before it is delivered to the retail dealers or consumers. Here the floors are either of granite or paved with asphalt; the latter is the case in the examining rooms, the furniture of which is extremely simple, and, indeed, a hose can be turned into it when cleaning is necessary. Not to be forgotten are the living apartments of the minor officials, which are also located in this building, nor the rooms provided for the storage of hides, etc.

The refuse matter, dung, etc., is carried to a reservoir, well covered and protected, some distance from any of the buildings. The sheet-iron carts provided for the purpose of removing this matter from the grounds are placed under this reservoir and filled through the holes in its bottom. Another building in the neighborhood, provided with caldrons, steam-chambers, scalding-pots, hot-water, and everything necessary for the cleansing of the various entrails, has been erected, so that all such operations can be conducted within the walls of the establishment, in order that no offal need be brought into the city.

It is wonderful how in Europe, or at any rate, in Germany, where the price of meat is enormous, what use is made of every particle which can possibly serve as an article of food — brain, heart, lungs, kidneys, liver — all are eaten. When one learns that a laborer earns about forty cents a day, a mechanic between fifty and seventy-five cents or at the most eighty-five, it is easy to believe that the working classes cannot frequently indulge in a meat diet, for the cheapest of meat at present sells for about seventeen cents a pound.

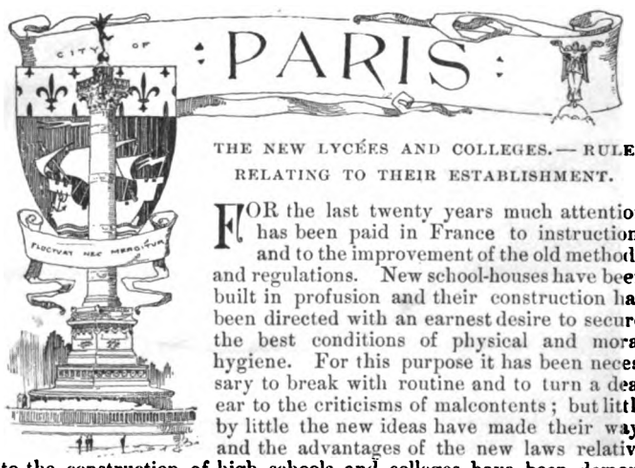
Within the enclosure are also two stables where the live stock can be kept before being slaughtered and after having been removed from the stock-yards, which lie across the road which separates the two establishments, the yards and the *abattoirs*. In general these stables are divided into stalls five feet wide; their capacity is quite limited because they are of course only put to a temporary use.

Ice-storage warehouses have not been provided because of the expense connected with them and they are, indeed, unnecessary, as most dealers possess them in their individual establishments. Be it also remarked that the grounds are very nicely laid out, well sodded and that the roads are either of granite-blocks or gravel as the case may require and that also wherever possible trees have been planted.

The stock-yards including wagon-sheds, stables for the temporary accommodation of the horses of the cattle-dealers and peasantry, market-halls, scales, out-houses need not be dwelt upon. Suffice it to say that no frame structures are to be found anywhere within the enclosure.

Finally, a few remarks on the water-supply and the sewage system. The former is derived from several wells not far distant. The capacity of the plant amounts to some 245,000 gallons per day. The water is pumped into eight reservoirs each containing 250,000 gallons, from which the water is distributed. As rarely more than 225,000 gallons are consumed daily, the water passing through the overflow is distributed throughout the net-work of waste-water pipes, flushing these and tending to keep them free from filth.

The sewage from the stock-yards and the *abattoirs* is conducted separately to a large catch-basin, divided, as usual into several compartments for collecting the solid matter, while the fluid passes on to the sewer. In case it should be thought desirable, the water taken up by this basin and before passing to the outlet can be purified by chemical or mechanical means.



THE NEW LYCÉES AND COLLEGES. — RULES RELATING TO THEIR ESTABLISHMENT.

FOR the last twenty years much attention has been paid in France to instruction, and to the improvement of the old methods and regulations. New school-houses have been built in profusion and their construction has been directed with an earnest desire to secure the best conditions of physical and moral hygiene. For this purpose it has been necessary to break with routine and to turn a deaf ear to the criticisms of malcontents; but little by little the new ideas have made their way, and the advantages of the new laws relative to the construction of high schools and colleges have been demonstrated; laws, which, if they lead to considerable expenses, at least

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assure the certainty of a solid and practical education. The adversaries of the present adminstration reproach it with wasting money in a profusion of luxurious constructions, in which millions have been swallowed up in buildings which are empty and deserted. It is true that much money has been spent and perhaps something has been sacrificed to a luxury of construction which is not always useful; it is evident, also, that the new schools and colleges are not filled with pupils: but there are several reasons for this which can be easily understood; and on an intelligent examination of the circumstances it must be acknowledged that the path recently marked out is followed in a satisfactory manner.

Something must be allowed for the slowness with which new ideas make their way in our country, and for the difficulty with which new programmes are thoroughly accepted, even after they are approved in theory. In the new order of educational ideas, one of the most difficult to establish is that relating to the academies for young girls, against which many people still rebel. Among these people are some who approve of convents and other boarding-schools, and who do not reflect that their opposition is therefore, illogical, and that it really applies to nothing more than the change of name; for, if the convents have a special position on account of the religious instruction they offer, this is not the case with the boarding-schools, which in changing their name change nothing in their educational aims, or in the objects which they strive to obtain, by means which become uniform as soon as the results to be attained are made the same.

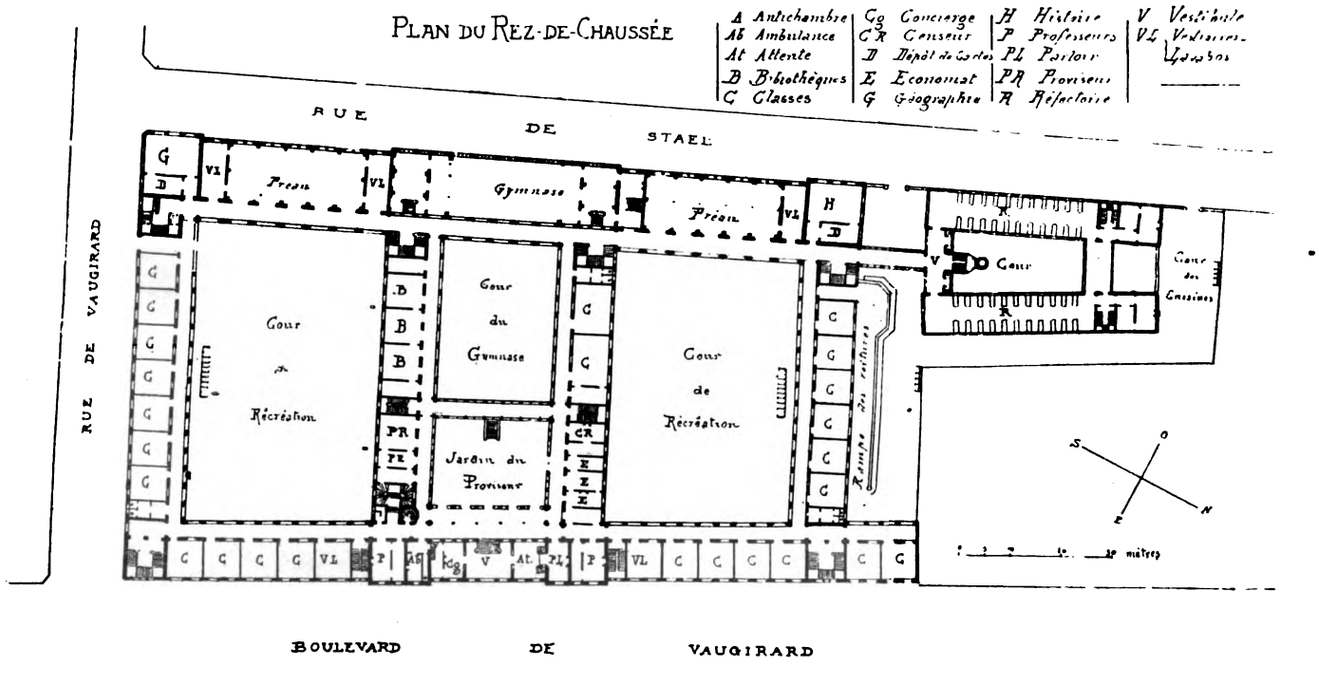
In any case, all the new academies and colleges, both for boys and girls, have some pupils; and the practical results achieved by the new education can only be shown in the future, when the next generation shall have given evidence of what it can do. For the moment, let us examine the laws relative to the conditions of the establishment of lycées and colleges, and see for ourselves how far behind them they leave the confusion of the ancient method, under which children were packed anyhow into their study-rooms, class-rooms and dormitories, without any attention to the laws of hygiene and morality. The lycées for boys are now required to provide for at least 200 boarders, 80 "half-boarders," and 200 day-scholars: and the maximum allowed is 400 boarders and 400 half-boarders and day-scholars. In certain important centres, particularly in Paris, city lycées may be established, receiving only half-boarders and day-scholars, 500 as a minimum, and 800 at most; and, in the country, lycées may be established for boarders and half-boarders only, with a minimum accommodation of 500, and a maximum of 700.

The pupils are divided into three sections: the large, the medium and the small. The classes, excepting those in history, science and drawing, are restricted to 30 or 35 pupils in each; and the dormitories are not allowed to contain more than 30 to 35 beds. To each dormitory is attached a lavatory, a wardrobe, a closet containing a "*chaise percée*" and servant's bedroom. The utmost liberty is allowed to architects in the arrangement of the different services of a lycée; but, in order to facilitate their work, it is thought useful to suggest the following conditions, which have hitherto been considered the best. According to these conditions each of the three sections of pupils should have its own playground, its own study-rooms, class-rooms, refectory and dormitories. The drawing-rooms, gymnasium and chapel are common to all the pupils. The buildings must be constructed, as far as possible, of local materials, and so planned that air and light shall penetrate everywhere. The playgrounds are to be open to the most favorable aspect, according to the region in which the school is situated, and must be sheltered from the most objectionable winds. Buildings only one room deep, permitting ventilation by opposite corridors, of which, however, those on one side are screened, so that light enters only at the opposite side, are recommended. A superficial area of one and one-half square metres, [about sixteen square feet. — TR.] is required for each pupil in the class-rooms, including in this the aisles, and the space occupied by the professor's desk and platform. In the study-rooms, the space required for the pupil is two square metres. The class-rooms for history, the lecture-rooms for physics and chemistry; and the drawing-rooms, should be large enough for 40 to 50 pupils. In the dormitories only two rows of beds, in the direction of the length of the room, are allowed; they must be at least a metre apart; and the windows must be so arranged as to secure ventilation, without exposing the pupils to draughts. A cube of air of 8 cubic metres is required for each bed. The lavatories, which must be easy of access and surveillance, should be in direct communication with the dormitories. The water-closets are usually placed in the playgrounds; in the vicinity of the dormitories there are only perforated chairs. The kitchen has a court to itself, communicating directly with the exterior: for the refectories, experience has shown that tables for 8 to 12 pupils are most suitable for the exigencies of service. The linen-room, easily accessible from the outside, is to be so placed as to permit the rapid distribution of linen in the dormitories. The dimensions of the gymnasium vary with the importance of the lycée; but it must be at least 8 to 10 metres wide, by 16 to 20 in length; and a court for military exercises should be reserved near the gymnasium. The chapel should not, in any case, have the importance of a church; and its position must be such that it will not obstruct the school business. In the large lycées, it is sufficient if the chapel will accommodate one-half the pupils. Finally, it is of advantage to provide an infirmary, in a building completely isolated, well-placed and well-ventilated, and furnished with a private garden for the convalescents. Architects must observe the same suggestions in preparing plans for the Communal colleges.

The lycées for girls, according to the terms of the law are to be arranged for half-boarders and "supervised day-scholars"; but cities may be authorized to attach a boarding department to their lycée or college. In the lycées for girls, however, the boarding department must be as far as possible independent of the day-scholar portion.

Among the lycées and colleges recently erected, we may select two, which fulfil these conditions in a perfectly satisfactory manner. One of these is the Lycée Lakanal, constructed in the neighborhood of Paris by M. de Baudot; the other is the Lycée Buffon, built on the Boulevard de Vaugirard by M. Vaudremer. The Lycée Lakanal was one of the first realizations of the very sensible idea of transferring to the open country the schools for boarders, leaving in Paris

LYCEE BUFFON



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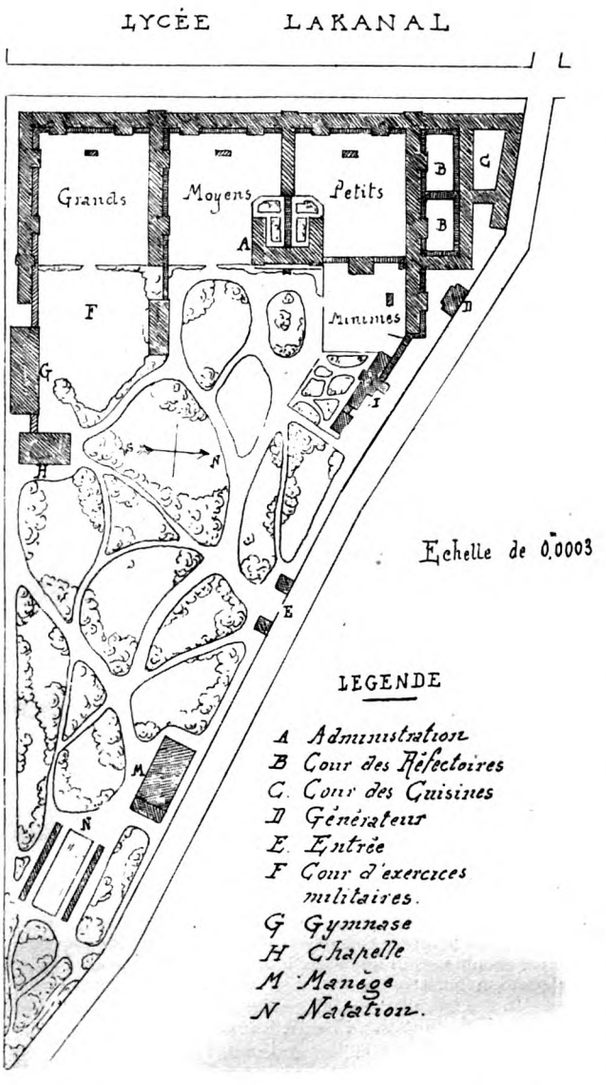
only those for day-scholars and half-boarders. It is built on what was once a magnificent estate, planted with splendid trees and occupying a surface of more than twenty acres. The buildings and playgrounds are at the upper end of the park, at the other end of which is a riding-school and a swimming pond. The different departments, as will be seen by the accompanying sketch-plan, are clearly indicated; the sections of pupils are well separated, and the general service, placed at the point most accessible from the public road, has its independent communications assured. The administration is centrally placed, yet convenient of access, and the infirmary is connected with the other parts of the construction only by an open portico, through which a patient may be transported under cover. This lycée will accommodate 720 boarders, divided into three sections, — the large, the medium and the small, of 240 pupils each; but the last section comprises a subdivision for the smallest children. The class-rooms, study-rooms and dormitories contain only 30 pupils each. All the conditions of health and comfort are thus very carefully satisfied. The water-closets are drained into sewers, and the whole establishment is warmed by steam from three boilers, placed in a special building, with valves and regulators, to modify the heat in various parts of the school. The lavatories, forming a projection from the block of dormitories, are provided with tip-up basins, discharging the water into a trough, which has a waste pipe at each end. This disposition avoids small waste pipes and prevents choking. The lighting of the class-rooms is unilateral; but, to secure an energetic



ventilation, openings, closed by shutters, are arranged in the opposite sides of the rooms. The windows extend to the very ceiling, to give the freest possible admission of light and air, and are very large, except in the dormitories, where they are narrow, but frequent, to give air to every bed. The material of construction is principally brick, of different colors, yellow, red and enamelled, disposed in bands and patterns of a varied and decorative effect. In a word, the general aspect of the whole establishment is bright and gay; the children are not shut up as in a barrack; and on whatever side they turn, they find themselves surrounded by verdure. All this result has not been attained without a sacrifice of money, and the total expense has amounted to the respectable sum of eight million francs. The architect has been somewhat criticised, and accused of having far surpassed his estimates; but, if a good deal has been spent, nothing has been wasted, and the Lycée Lakanal is an interesting work, which does honor to the original and practical talent of M. de Baudot, who is an ardent disciple of Viollet-le-Duc.

We have now to examine the Lycée Buffon, which passes for a model of its kind, and is moreover, the work of an architect who is a noted master in such undertakings, M. Vaudremer. It is, indeed, to him that we owe the Lycées of Grenoble and Montauban, and that for girls at Passy, near Paris. M. Vaudremer, instead of exceeding his estimate, has, on the contrary, made a saving of more than a million — an occurrence rare enough to be noted. The estimates amounted, in fact, to six and one-half million francs, and thanks to the discounts obtained, and the skilful direction of the work, the actual cost was only about five millions. The Lycée Buffon is arranged to accommodate 450 day-scholars and 350 "half-boarders"; it occupies a lot open on three sides, with its principal front on the Boulevard de Vaugirard. The general aspect shows the character peculiar to all the works of M. Vaudremer, whose robust and logical talent is marked by a certain monastic sentiment. In the Lycée Buffon this charm is not wanting, but is modified by a certain severity and calm which are very appropriate. The long lines inevitable in such a construction are interrupted by wide openings, and the window-frames and sashes, painted of a pale green color, brighten in a very original manner the monotony of a long repetition of parts.

The entrance is formed by three doors, covered with flat arches, ornamented with stained-glass, and opening into a vestibule of a charming effect. On the left is the concierge; on the right a waiting-room, preceding the parlor. In front are steps, leading to a great hall, across which is seen the director's garden. This hall, or rather gallery, is divided into two parts by columns, and has a pretty effect. The proportions are carefully studied, and the decoration obtained in a simple manner, by an ingenious construction, frankly indicated; the stone and brickwork of the masonry, everywhere shown, even in the arches of the ceiling, with the iron girders and joists, forming the principal elements.

Around the director's garden is arranged the house-keeping department, with the offices of the director and the steward; whose living rooms are on the second story, reached by a special staircase, very elegantly decorated. Separated from this garden by a glazed gallery is the gymnasium court, around which are the libraries, that for the school, and the general library, and on the opposite side, two large class-rooms. The second story of these buildings, which forms the central point of the group, is occupied by collections, the natural-history lecture-room, and two class-rooms.

The left-hand part of the group is occupied by the division of large scholars; that on the right by the smaller ones, and beyond this is the kitchen department, completely distinct from the rest. To reach the young pupils' court from the kitchen court, which is at a lower level, a *rampe* is arranged for carriages. The court of the older pupils is reached by a special entrance from the Rue de Vaugirard. Around each of these courts, as may be seen by the accompanying plan, are the class-rooms, each arranged for 32 pupils; wardrobes, lavatories, and beyond, on the side of the Rue de Staël, along which extends the rear façade, are the playgrounds, and the gymnasium. The study-rooms are situated on the second story. Over the covered playgrounds are the physical class-rooms and laboratories, with flat roofs, for experiments in the open air. These rooms communicate with the chemical laboratories and lecture-rooms, and the physical lecture-rooms. There are two lecture-rooms for physics and two for chemistry, arranged to give facilities for all possible experiments. Light is brought in from the top; but openings, with shutters, accessible from a suspended gallery at half the height of the room furnish a prompt and powerful means of ventilation.

Over the gymnasium, under the roof, is the drawing-room. The courts are bordered on three sides by galleries, open on the first story, and closed on the second story on the side next the lecture-rooms. The aspect of these galleries is very agreeable, and the hand of an artist is perceived as well in the graceful arcade of the first story as in the colonnade of the second story, which carries a wooden plate, supporting the rafters, the ends of which are shown. This exposed construction is painted of the same light green color as the other woodwork, but brightened by red points and lines in the chamfers and on the mouldings. The effect is luminous and soft, decorative and simple at once, giving a suggestion of a cloister which is not without charm. The heating is by steam, on the system Geneste-Herscher. There are three boilers, two of which are regularly in operation. The apparatus has been the object of special care.

An examination of the plan will show, without further explanation, the convenience of arrangement, the facility of communication, and the clear indication of the different departments; but what cannot be inferred from the drawings is the diversity of aspect, the ingenuity of the details, and the cleverness with which the programme is translated into material forms. The gymnasium hall is perfectly successful and charming as a design, yet simple and unaffected; everywhere and always the decoration is rational, logical and derived from the construction, which it defines instead of concealing, as it too often does. Here is no papier-mâché, no imitation of any sort; it is all stone, brick, iron and wood. This quality of frankness is common to the two authors of the Lycées Lakanal and Buffon, who, however their special styles, which are matters of taste and training, may be discussed, are both men of conscience and conviction, both artists who will do lasting honor to the architecture of our era.

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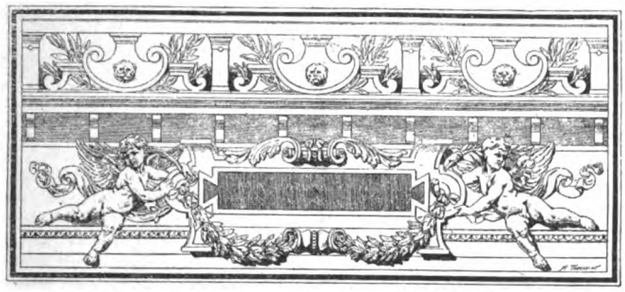
VAULTING.[1]



FROM the time when the great hall of the Baths of Diocletian was built, to this day, the crossing of two vaults of different spans has remained a puzzle, solved in different ways, but always from some point of view unsatisfactorily.

The Romans adopted a circular section for both the wider and the narrower vault, but stilted the latter so that both vaults should be at the same level at the crown. Their vault was practically a concrete cast, and the centring was its mould; the groin lines were not determined beforehand, but were simply the intersection of the vaulting surfaces used, and they formed wavy lines on plan — that is, lines not contained in vertical planes.

In Mediæval architecture, when vaults were built of stone, transverse and longitudinal arches were built, forming a ribbing on which the vaulting was placed, an arrangement which is, in my opinion, the outcome of one of the elements of Roman construction. In this system the groins are naturally contained in vertical planes, but the surface of the vault is twisted to adapt itself to the ribs.

At the Renaissance the Roman system of groining came again into favor, but the eye which had got accustomed to see groins lying in

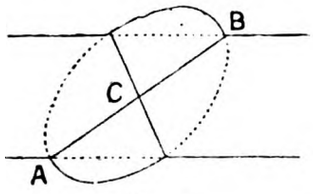


FIG. 1.

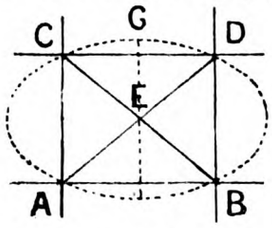


FIG. 2.

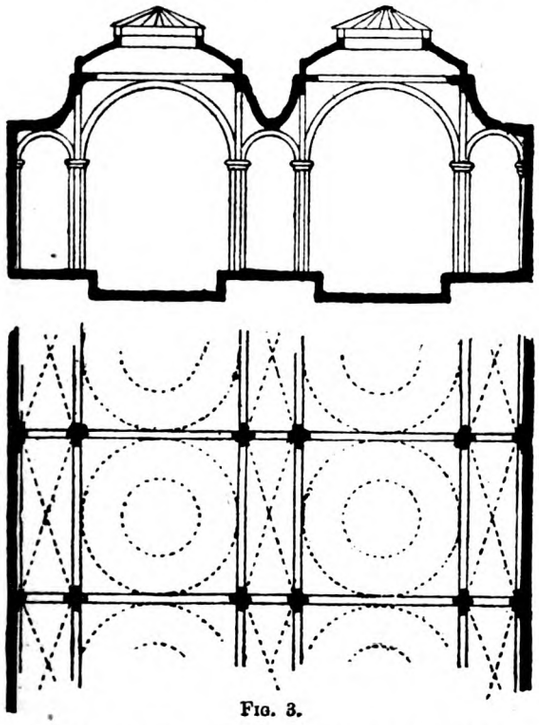


FIG. 3.

vertical planes could not brook the twisted groin lines of the Roman vaults. The Renaissance vault starts, therefore, from the very opposite direction of the Roman; the first condition laid down for the vaulting is that the groin lines shall be in vertical planes, and from this condition the sections of the vaults themselves are deduced. This led forcibly to the adoption of elliptical arches.

But elliptical arches have a weakly appearance when compared with circular ones, so efforts have been made to get all the face arches circular, and yet obtain groin lines in vertical planes. Sir Gilbert Scott, in his lectures, proposed a system which I believe he had employed in the carriage-way to the court-yard of the Foreign Office. There the narrow arches and the wider ones are circular; the larger span is covered by a cylindrical barrel-vault, and on its surface the groin lines are determined by the intersection of the vault with vertical planes; then the triangular spaces left between these groin lines and the narrower face arches are filled by a channel surface, a surface generated by the motion of the face arch in contact with the groin lines. This gives a sightly vault, but somewhat difficult to work with precision on the banker; moreover, the properties of its surface are vague, and therefore it is a surface difficult to decorate.

The solution I propose secures all the desirable advantages of the former vaults, circular arches, groins in vertical planes, and regular simple surfaces of vaulting. It is founded on a special property of Quadratic Surfaces, or surfaces which give conic sections in all directions. If two quadratic surfaces have one axis in common, then their intersections lie in planes. This is easily tested in the case of an elliptical dome [Figure 1], and a cylindrical vault rising to the same level at C. If we cut the cylindrical vault by a vertical plane, A B, the section will be an ellipse; and if we cut the dome by the same plane we shall have again for section the same ellipse as with the cylinder. It is evident, therefore, that the two surfaces intersect one another along this section.

Some ellipsoids are of revolution — eggs, for instance. Now if [Figure 2] a cylindrical vault spans the wider arches A B and C D, and an elliptical dome of revolution, with its minor axis, G E, equal to the span of the wider arches, be made to pass through the smaller arches A C and B D, then the intersection of these two surfaces will give straight lines on plan. In this scheme the arches A B and C D will be circles, the arches A C and B D will be also circles, the triangular cells A E B, C E D will be cylindrical, the triangular cells A E C, B E D, will be portions of an ellipsoid of revolution, a surface as regular and nearly as simple as a sphere. Such a vault will be easy to work on the banker direct from the working-drawings, without any preliminary fitting of the stones, distinguished in common parlance by the title of *fudging*. Every section of the ellipsoid being an ellipse, the surface of the vault will be capable of elegant geometrical decoration.

In the construction I have proposed the intersection of the groins is at the level of the crown of the larger arches, but there might be cases where one would wish to get the intersection of the groins at the level of the crown of the smaller arches. For instance, in a railway station [Figure 3] like the Great Northern Terminus, the central platform might be covered by a narrow vault, and the spaces over the lines by large arches bearing cupolas open at the top for the escape of smoke. Over the central platform it might be desired to carry a longitudinal gutter, and therefore to keep its vault down. Now this problem I can solve as easily as the former.

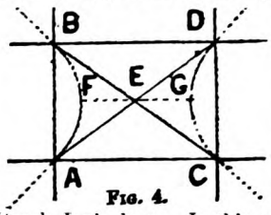


FIG. 4.

I cover the narrow vault A B [Figure 4] with a cylindrical barrel, and the wider vault, A C, with an hyperboloid of revolution, which is exactly the same surface as the scotia of the Greek Ionic base. In this case we should have all the advantages of the former construction, except that the vault would present the unusual appearance of the mouth of a trumpet.

I hope soon to get the Class of Masonry to produce a model of one of these vaults, and I shall be happy to show it to any one it may interest.

[1] From a paper by Lawrence Harvey, Instructor of the Class of Masonry at the City and Guilds of London Institute, in the Journal of Proceedings of the Royal Institute of British Architects.

EGYPTIAN GLASS. — The art of making glass in Egypt appears to have been as old as the twelfth dynasty, where it is first represented in the tombs. Dated specimens of the time of the eighteenth dynasty, one with the name of Thothmes III, are exhibited in the British Museum. The principal uses of glass were for small vases for holding unguents, perfumes, or paint for eyebrows and lashes. These bottles are generally of an opaque and semi-opaque glass, with light or dark blue backgrounds, and feather or wavy lines of yellow, light blue, and white color, running in horizontal bands on the surface round the body of the glass. These vases are as old as the eighteenth dynasty, and if not made at Thebes and Memphis, were imported from Tyre or Sidon. The principal forms resemble the Greek *amphoreus*, the *oenochoe*, and the *alabastros*. Transparent glass appears not to have been in such early use, and the larger vases of a transparent bottle-green with conical bodies and long necks, are of the age of the twenty-sixth dynasty, or about B. C. 600. Later, Egypt exported glass vases to Greece and Rome; and specimens of later vases, with figures in relief, like cameo, in white or various colors on a blue or red ground, will be found amongst those exhibited. Besides vases, a few small articles were made of glass, such as beads, bugles, pendants, figures of deities, animals, and emblems for inlaying into sarcophagi, and other objects for walls and parts of edifices. For these opaque glass, red to imitate jasper, dark blue lapis-lazuli, and mottled or schmelz glass, were used. At the Ptolemaic period transparent dark blue glass was introduced, and camei pastes and other objects were made of this material Some of the most remarkable are the glass mosaics representing comic masks and other subjects, made by composing cylinders of different colored glass, so that the subject could be reproduced by cutting horizontal layers of the cylinder. In the days of the Roman empire there was a large manufactory at Alexandria, the sand of the locality being considered, with that of Tyre, the best in the Roman empire. — *The Architect.*

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ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

PULPIT, CATHEDRAL OF ALL SAINTS, ALBANY, N. Y. MR. R. W. GIBSON, ARCHITECT, NEW YORK, N. Y.

[Gelatine Print issued only with the International and Imperial Editions.]

YOUTH'S COMPANION BUILDING, CORNER OF COLUMBUS AVENUE AND BERKELEY ST., BOSTON, MASS. MESSRS. H. W. HARTWELL AND W. C. RICHARDSON, ARCHITECTS, BOSTON, MASS.

THE ABBEY OF ST. DENIS, FRANCE.

For description see article elsewhere in this issue.

CENTRAL MARKET HOUSE, LANCASTER, PA. MR. JAMES H. WARNER, ARCHITECT, LANCASTER, PA.

DESIGN FOR A COUNTRY HOUSE. MR. THOMAS WHEELER, ARCHITECT, BOSTON, MASS.

HOUSE OF JOS. MICHAELS, ESQ., ROCHESTER, N. Y. MESSRS. ROGERS, STURGES & STERN, ARCHITECTS, ROCHESTER, N. Y.

[Additional Illustrations in the International Edition.]

BED-CHAMBER EXHIBITED AT THE PARIS EXPOSITION OF 1889 BY THE MAGASINS DU BON MARCHÉ.

[Copper-plate Etching.]

OFFICES OF THE COMMANDER-IN-CHIEF, VIENNA, AUSTRIA. PROF. WILHELM V. DODERER, ARCHITECT.

[Gelatine Print.]

THIS is an oblong structure with a frontage on four streets and is 53 metres in width, 72 metres in depth and 25.3 metres in height to the cornice. Two entrances of a similar character lead to an inner court 24 metres by 33 metres, surrounded by Ionic and Corinthian pilasters. In the basement are the storage-rooms for documents, etc., the stables, carriage-house and appliances for heating the building with hot water. In the ten Corinthian columns supporting the balustrade one sees an important part of an harmonious whole and that they are not placed against the side of the building with no apparent purpose, as is often the case. The building was erected from plans by Professor von Doderer at a cost of about $630,000.

VILLA OF HERR PETSCHE, GRATZ, AUSTRIA. HERR HANS PRUCKNER, ARCHITECT.

[Gelatine Print.]

IGHTHAM MOAT, KENT, ENG. DRAWN BY MR. EDMUND SEDDING.

ST. JOHN'S ROAD, WINCHESTER, ENG. DRAWN BY MR. EDMUND SEDDING.

THE BADIA DI FIESOLE, FLORENCE, ITALY.—THE FACADE. DRAWN BY MR. R. WEIR SCHULTZ.

ST. ANDREW'S CHURCH AND SCHOOLS, FORT WILLIAM, N. B., SCOTLAND. MR. ALEX. ROSS, ARCHITECT, INVERNESS, SCOTLAND.

THE church was completed a year ago. It is built of red granite with white freestone dressings, and slated with Cumberland grey slates. The church, which is richly finished, has cost about 10,000*l.*, and the schools adjoining have cost about 5,000*l.* more. The fittings are of the most elaborate kind, the reredos being of Caen stone, with beautifully carved panels representing events in the life of our Lord. The altar-piece represents the Crucifixion, in Venetian mosaics, and, as well as the pulpit and carving, is by Messrs. D. & A. Davidson, Inverness. The vestry door and choir desks are solid oak. All the windows have been filled-in with stained-glass. The narthex, shown in view, is a notable feature, being groined in stone, and the window filled with stained-glass throughout. The schools are equally elaborate with the church, and the erection of both church and schools is mainly due to the zeal and energy of Mr. E. B. Davy, of Spean Lodge. A parsonage adjoining the church is also contemplated.

MANNESMANN STEEL IN GERMANY.

"All the Modern Improvements."—No. 9.

THERE is an exhibition of steel tubes and other articles being held in the garden pavilion of the Architect's Hall in Berlin, which raises an increasing interest among native engineers and builders, and can hardly fail to be of interest to Americans with knowledge enough of existing productions of the same kind, to apprehend the variation of the new invention and to measure the worth which is claimed for it. I cannot pretend to give an account that will satisfy specialists; and I must note in my own behalf that the lecture of the introducer of the steel, Privy Councillor Professor Reuleaux, had taken place before I arrived in town.

My attention was called to the subject, therefore, not by first hand, so to speak, but through the enthusiasm of architect-friends who visit the hall.

In their company, it is to be confessed moreover, that the models of the machines used in producing the tubes were neglected in favor of the finished productions themselves. Engineers probably would have been drawn most to the rolling-machine, for the prime fact about the new invention is the method of rolling employed, just as the advantages of the products of the Mannesmann machines are referred to this: a method of rolling obliquely or cross-corner-wise.

The grain of the steel is made predominantly spiral-like. The surface that is exposed to the rollers directly shows sharply-drawn spirals. Away from the surface, the spirals grow more uneven, irregular and weaker, in consequence of slower reaction to the pressure of the rolling-machine and follow the influence of the forming spirals in their proximity, in such a way as to form a weft possessed of extraordinary tenacity and elasticity. Just what relation the latter quality bears to that of other steels has escaped my memory. The tenacious power of the oblique-rolled Mannesmann steel is claimed to be six times that of any other. If the claim prove good, what a new era is opened in construction!

Of the examples of tubes displayed, the greatest number, perhaps, belong to the class adapted to proving the admeasurement powers of the Mannesmann patents. Near giants of from 200–375 mm., diameter, there are dwarfs of a pencil-like size, and under tubes of from fifty to sixty centimetres thickness of wall, hang others of less than 1 mm., thickness. The inventors assert that the capacity of their machines will be improved so as to produce rolled-tubes of 500 mm., and even of a metre diameter, and that there is no limit to the increase that is possible in this direction.

The length of tube that has been rolled is said to be ninety English feet. The longest example at the hall measures forty-five feet, and is bent, for facilitating transport, into a hot-water radiator-like form. Nothing can exceed the niceness and pureness of the bends, so far as the texture of the metal is concerned: smooth and firm the distended outer inflection is without a sign of molecular loosening, or any other of the common results of the mighty force that goes to making acute curves in rolled-steel of the like diameter. And this same important trait is shown in numerous smaller objects, where extensions, distensions, turns, bends and convolutions of the most fanciful shapes occur, from that of a bow of a necktie, to the double knot of fillet work. Nowhere in the interesting series does the metal come short of perfect smoothness at every point; and the pieces bent vary in thickness from that of a leaf of paper to that of a volume of the "Authors' Household" editions. Objects are displayed from the dimensions of boilers, beams and irrigation tubes, to the filigrees of door-plates. It would be useless to describe them here. Builders will conceive at a wink what advantages must come of a process that shall make the firm, hard, tenacious qualities of steel, still harder and more tenacious. And it is to these that the present exhibition in the German capital has evidently wished to address itself most. But these same advantages implying as they do, a diminution, moreover, in the natural tendency of steel to oxidize in consequence of the diminutions of molecular looseness effected by oblique rollings, will be suggestive likewise to the decorator, where he needs a material that is insensible to strain, weight, exposure and use, or chief of all, to misuse.

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BOOKS AND PAPERS.

MR. W. B. Tuthill, who is already very favorably known as a writer on matters of practical architecture, has tried his hand on city buildings[1] in a volume of convenient size, very fully illustrated with plans and sketches of detail. We need hardly say that the book is a very different matter from those common collections of ugly and vulgar designs, prepared by persons who judiciously endeavor to conceal their ignorance by restricting to the smallest possible limits the text with which they accompany their designs. Mr. Tuthill is a man of experience and observation, and what he writes is intended for readers of more discernment than the seekers after ready-made plans who consume the ordinary works on such subjects.

The book begins with an essay, whose principal fault is that it is not long enough, on the planning of city houses and apartment-houses, or, as we ought rather to call them, tenement-houses, since none of his plans cover ground enough, or contain rooms enough, to bring them within the category of the great apartment-houses. Of course, the plans are more or less open to criticism; but as they are not put forward as models, but only as illustrations of various types of planning, now common in New York, they are really of more value than if they aimed at a new ideal of perfection, while the conditions of each problem are clearly and judiciously stated. Following this part, which occupies only forty-six pages, comes a collection of suggestions, notes and observations on the practical matters of city-house building, divided between mason-work, carpenter-work, painting and ironwork, which will be found of great value to young architects and amateurs, and which even the most experienced architects may read with profit.

BUILDING LAW.

NEW YORK, N. Y., May 3, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — The finding of the jury in the criminal libel suit of Lamb & Rich *vs.* A. J. Bloor, has resulted in the following retraction in lieu of the $2,000 verdict given by the jury:

NEW YORK, April 23, 1890.

I hereby retract the circular entitled "To Reputable Architects," reflecting upon the character of Lamb & Rich, and agree to publish no further communications in the matter.

(Signed) A. J. BLOOR.

Mr. Bloor pays costs, renders a list of parties to whom he sent circulars, and promises to send copy of retraction to each one.

Yours truly, SMITH & WHITE,
Attys. for Lamb & Rich.

COMMUNICATIONS.

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

A FIREPROOF STAIRWAY.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Will you kindly allow me a few lines for justification in regard to the comment (expressed about my staircase design) made by a "Draughtsman," in your issue of May 3d, wherein he obviously intends to make it appear that I tried to pass off other people's ideas as my own. I have simply to state, that:

1. I worked out the design entirely from my own ideas; never had the least knowledge that this device was used twenty-five years ago in Scotland and twenty years later in New York; neither have I seen a drawing of such or a similar stairway.

2. I left it to the Messrs. Editors to publish it or not and I wonder where your correspondent finds my expression that I "*claim it for something new.*" (See his letter.)

3. That these stairs are "*almost always adopted for the British Army Barracks,*" shows evidently their fitness and had they been extensively used here for the last twenty years, most of these "wholesale roastings" of tenants and working people would have been averted.

4. The stairway can easily be arranged without interfering with continuous shafting. For dwellings, where the front space is very valuable, simply place the stairs into rear wall and run a fireproof hall out to street. Respectfully yours, C. H. RAU.

THE ROTCH TRAVELLING-SCHOLARSHIP.

DENVER, COL., April 26, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Can you inform me in regard to the conditions of the Rotch Travelling-Scholarship. If so would be much obliged.

Yours respectfully, D. R. HUNTINGTON.

[THE Rotch Scholarship is restricted to persons not over 30 years of age, who have spent at least two years as draughtsmen assistants or students, in the office of an architect resident in Massachusetts. Candidates are examined in April of each year under direction of a committee of the Boston Society of Architects, and the one passing the best examination receives from the Trustees of the Rotch Fund $1 000 a year for two years, on condition of studying faithfully abroad, showing his progress by sending home drawings and sketches. — EDS. AMERICAN ARCHITECT.]

PORTABLE CHAPELS.

RICHMOND, VA., April 29, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — I am desirous of getting the address of some manufacturers of knockdown chapels, that I may get price lists from them to lay before our building committee. If you advertise any in *American Architect* I would be greatly obliged if you would mail me their address. Yours respectfully, CHARLES H. CREW.

[WE do not think anything of the kind is made in this country, although houses in sections are, or have been, sold by a company in New York. Iron chapels are made, and packed for transportation, in England. Probably Messrs. Francis Morton & Co., Garston, near Liverpool, could give information about them. — EDS. AMERICAN ARCHITECT.]

BOOKS ON THEATRE CONSTRUCTION.

CHICAGO, ILL., May 5, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In answer to your correspondent who wishes to know the latest and best work on theatrical planning and construction, will say that the latest work we know of, and it is a good one, is "*Traite de la Construction des Theatres,*" by Alphonse Gosset. Paris: Baudry & Company, 1886.

The "*Theatres de L'Europe,*" by Clement Contant, is a very good book, but it is rather old now; at least, the edition we have was printed thirty years ago, and it does not give the most modern methods and designs of construction.

We know of no modern publication in the English language. A good book in our language is greatly needed.

Yours very respectfully, W. & P., *Architects.*

NOTES AND CLIPPINGS.

INTERNAL DECORATION IN ENGLAND. — The epic style of painting, prior to the days of West, found no legitimate patronage; and had it not been the custom from the time of Charles II, who, at the Restoration, introduced a portion of the prevailing French tastes under Louis XIV, for splendid internal decoration in the palaces and houses of the great, those who studied the "grand or epic style" might have shared the fate of the epic writers. Hence the chief employment of the father of British historical design, the venerable Sir James Thornhill, was the painting of the ceilings and alls of the royal palaces and the mansions of the nobility. Happily for this artist, however, he inherited a competent patrimony, for he could not have maintained his respectable establishment by the operation of his pencil and palette, although he peopled more space with gods and goddesses than have since been created by all his successors, including all the schools, his ingenious labors being paid for, not by the mental measure of his talent, but by measurement by the superficial yard. Plafond-painting has long since become an obsolete art, which is to be regretted, for nothing within the sphere of internal decoration is more strikingly grand, or more generally imposing, than a splendidly painted ceiling in a state apartment. Sir Peter Paul Rubens, for painting the magnificent plafond of the banqueting-chamber of Whitehall, received the sum of four thousand pounds, which, occupying little more than the superfices of four hundred yards, gives for his labor nearly ten pounds per yard. This ceiling, designed as it is in richly carved compartments, finely combines with architectural effect. It should be remembered that this grand work was executed for that distinguished patron of art, the unfortunate Charles I. Our countryman, Sir James Thornhill, who plied "the epic trade" nearly a century afterwards, when the value of money had so much decreased, received for his laborious and crowded designs in the great hall of Greenwich Hospital only three pounds per yard. He was nearly twenty years employed upon this work, beginning in 1708 and ending in 1727. It is true that he was not a Rubens! It may, perhaps, be worth recording that during the progress of this laborious undertaking several attempts were made by the ruling powers to screw the painter to a cheaper contract. Sir James was stout in his demand, and the affair

[1] "*The City Residence, its Design and Construction.*" By W. B. Tuthill, A. M., Architect, author of "*Practical Lessons in Architectural Drawing,*" "*The Suburban Cottage,*" and Editor of "*Interiors and Interior Details.*" New York: William T. Comstock, 23 Warren Street. Price $2.50, free by mail.

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was referred to several eminent artists, natives and aliens, then practising the art with various success in the British metropolis. These worthies were Vanderveldt, Cooper, Richardson, Sykes, and Degard, who reported in favor of Sir James, "that the performance was equal to any of the like in England, superior in number of figures and ornaments." Foreign painters, however, it is evident, brought their talent hither to a better market. M. Rosso received of the Duke of Montagu for painting his saloon two thousand pounds; his grace, moreover, provided an extraordinary table for him, his friends, and servants for two years, at an expense of 500*l.* per annum. Monsieur was paid at the rate of seven pounds per yard for his designs. Signor Verrio fared even better than Rosso, for he received for all his works, ceilings, walls, grand stairs, and back stairs, at the rate of 3*l.* 12*s.* per yard, exclusive of gilding; had apartments in the palace, a good house in the home park, had a table provided for himself and servants, and plenty of wine. He was almost as extravagant as Charles II, his royal patron, and drew so largely upon the privy purse that the merry monarch observed, "Verrio, i'faith! a few more such expensive chaps as you and myself would drain the royal exchequer." The signor at length becoming infirm, and his eyes failing him, obtained a pension from the king of 200*l.* and allowance of wine for life. Signor Rizzi was employed by the Duke of Portland to paint the plafonds of three rooms, for which he received 1,000*l.*; for the little chapel at his grace's seat, Bulstrode, 600*l.*; and of the Lord Burlington, for the staircase at his mansion, 700*l.* Signor Pellegrini, an Italian also, received of the Duke of Portland for decorations, 800*l.* and other sums. And of the aforenamed earl, 200*l.* for painting the walls of his entrance hall. Hayman once "lamented that he had not practised as a ceiling painter, as he then should have been enabled to pick up a good living." "Yes," replied Roubiliac; "but then, Master Frank, your good living would be procured at the daily risk of breaking your neck."—*The Architect.*

"The Meteor Convents" of Thessaly.—Among the most interesting convents in the world are the "Meteor Convents" of Thessaly, northwest of Trikala, on the River Salamvria. These properties, as well as nearly the entire Province of Thessaly, were conceded to Greece in 1881, at the time of the border-line regulation between Turkey and the former kingdom. These convents received their name of "meteors" (floating in the air) by reason of their peculiar position, *i. e.:* they are built upon cone-shaped rocks, which rise in precipitous cliffs directly from the prairie land. Many of these monas eries can only be reached by means of ropes and ladders. This strange, rocky region was discovered during the fourteenth century by monks who were driven from the Athos convents by the Turks. Here upon one of these columns of rocks they built their abode. Soon after one of the brothers discovered upon an adjacent summit a larger area, upon which he founded another monastery. In the course of time twenty-four of these "meteor convents" sprang into existence, and they are situated on or between the rocks at a height of from 2,400 to 2,500 feet. Their inhabitants were, of course, secure from all the persecutions of their enemies. But they were in turn confined to a life of hardship and privation. All provisions must be brought from distant places and taken up to the convents by means of ladders and ropes or baskets. At present nearly all the "meteor convents" are lying in ruins, and only seven of them are inhabited to-day by about seventy monks. Visitors who desire to ascend to one of the monasteries are compelled to announce their presence by loud calls or horn signals. One of the brothers is then dispatched down in a basket, which is fastened to a stout rope or cable. It is his duty to receive the letter of introduction without which a stranger is not permitted to enter the cloistered walls, and only after the prior has examined his credentials is he allowed to intrust his person to the basket and the trip through the air. Once within the convent walls every visitor is made welcome, for, despite their poverty, the monks practice the noble virtue of hospitality. The Byzantine Emperor, Johann VI, entered one of these monasteries and lies buried there. Some of their churches and chapels are beautifully decorated and remarkable for their architecture. The University of Athens has lately acquired the valuable contents of some of these convent libraries. The view from these summits is magnificent beyond description; to the west extends the lovely panorama of the Pindos mountain-chains, while in the east spread the fertile fields of the rich valley of the Salamvria.—*St. Louis Post Dispatch.*

Cordova, S. A.—A first stroll in Cordova reveals a city of antique churches, encompassed by hills approaching the dignity of mountains. Time-worn and battered towers and domes loom up in every street towards the centre of the town. Fronting on the Plaza stands the Cathedral, with its Oriental façade, double towers and massive dome. The interior may be cold and repelling, but I have seen nothing in South America more picturesque, especially in the mellow light of early evening, than this grim, battlemented pile, fashioned like a stronghold of faith. Not far away is the Jesuit Church, with medallion paintings of the chief saints of the Order, and a ceiling of carved cedar which is said to have been pieced together without hammer or screw. The Jesuit missionaries here, as in Paraguay, taught the native converts to be expert wood-carvers, and this is one of the oldest samples of their work. The metal with which it is ornamented came from Peru. The art may be crude and the shabby building itself sorely in need of repairs, but when one has seen hundreds of bad copies of the Renaissance churches of Southern Europe, it is refreshing to find an honest, albeit dingy, bit of mediæval architecture. There are a dozen churches in addition to those which I have mentioned, all of them filled with bad paintings and ornamented with tinsel and gilt, black with age and dust. There are, besides ruined monasteries, convents with orange trees in the interior courts, and orphanages where girls are taught by Carmelite nuns to make lace There are signs of the outbreak of a restoration mania in the ecclesiastical structures. Decorators are at work in several of the churches, and the new tones of color contrast strangely with the time-stained woodwork and faded frescoes and medallions, and with the blackened and crumbling towers. Bold attempts are making to modernize one or two of the churches. This is the first stage of a restoration movement. In the end many of them may be reformed out of existence. Mediævalism, while picturesque, has its drawbacks. It is a wet blanket upon the business of the town. Cordova suffers in a commercial sense from having the reputation of being old and musty. The florid modern architecture of the new public buildings near the Plaza is a loud protest against reactionary tendencies which retard the natural progress of the city. But ornate as these handsome structures are, they are not to be compared in grace and beauty with the old Moorish Cabildo which adjoins the Cathedral. That has a symmetry and a simplicity perfectly in keeping with the general lines of architecture of an antiquated Spanish town.—*Correspondence N. Y. Tribune.*

The Easter Island Monoliths.—Mr. Walter Hough contributes to a recent number of the *American Naturalist* a paper in regard to the monoliths of human shape found on Easter Island, in the South Pacific. One of the idols is in the National Museum, together with smaller stone images, painted slabs and other evidences of the curious civilization of the islanders. The deep, wide eye-sockets of the big statues were carved for eyes of obsidian, and doubtless one reason for the extreme rudeness of the sculpture consists in the fact that the statues were once decorated so as to conceal their defects of anatomy. The quarry whence the monoliths came is twelve miles from the spot where the largest number has been found, and the way is difficult. Many are in the quarry, half finished. Others are abandoned on the way, yet one in place weighs about fifty tons and is sixty feet high! The islanders had no metal tools and were ignorant of the wheel. Yet they built small, heavy-walled houses of stone, lined and roofed them with slabs of stone, on which figures of animals of eccentric form were painted. Doors are very narrow and the roofs are covered with turf. For writing they used very curious and beautiful letters, carved with sharks' teeth on slabs of wood. These letters are not alphabetic, of course, but are condensed pictures which recall the past events, like the "talking sticks" used by the medicine men of North American tribes. Paymaster W. J. Thompson, who was on the "*Mohican*," when this collection was made, will contribute a monograph to the report of the Smithsonian, giving all that is at present known concerning the sculptures.—*Boston Transcript.*

TRADE SURVEYS

Railway returns and bank clearings show that everything is moving along satisfactory. The volume of railway traffic is increasing faster than the best posted railway managers predicted four months ago. The volume of business is also heavier, in nearly every branch of trade, than was counted upon. Purchases of raw materials which were checked during the second and third months of the year have again set in on a large scale, considerable improvement being apparent in this respect within the past few days. Building operations have been generally resumed, the strikes having been settled in large part. The business and financial interests have already discounted the effect of the pending silver legislation, and when the compromise measures now under consideration are agreed upon, the changes consequent upon the enlargement of our monetary basis will be made so gradually as to occasion no trouble or inconvenience. So far as building interests are concerned, they have escaped with much less damage and interruption than was anticipated. A vast amount of new work is now looming up, particularly in the smaller cities and towns throughout the country, more especially those in the far West and South. Manufacturers of heavy material, such as lumber, brick, iron, steel, etc., entering into the construction of buildings of all kinds, are doing a phenomenal business at this time, the intention of builders everywhere evidently being to hasten work as fast as the supply of labor will allow. The possibility of further labor complications is one reason for pushing work through. Builders and manufacturers know that labor has had its appetite whetted by a very widespread success, and fear that another experiment of the same kind may be made before the season is over. Iron and steel makers in all sections are well supplied with work, especially in plate and structural iron, sheet-iron, wrought-iron pipes and tubes, and merchant bar. The steel rail-makers are running their mills full time. From present indications, the new mileage for the year will reach about 6,000 miles; but counting repairing and extension requirements, the total amount of rails purchased will cover 11,000 to 12,000 miles. There are heavy requirements for steel billets.

The nail factories are running nearly full time, both East and West. All the sheet-iron mills are crowded with work. The blast-furnaces are turning out the usual heavy supply, but there is a tendency to lower prices in all iron centres. The lumber manufacturers of the Northwest are meeting with great encouragement in Western markets. Spruce in the East, hemlock in Pennsylvania and poplar in the West, are selling well, production not being in excess of demand. Yellow pine is also holding its own, owing to the heavy consumption in the South, and expanding demand in the new markets in the North. The lumber manufacturers in the Southwest are also favored with a good demand. The entire Southern lumber interests are prospering in a manner and to a degree that is attracting the attention of a great deal of Northern investing enterprise. Among the smaller industries there is a fair degree of activity, in view of prospects for a good fall trade. Jobbers in Boston, New York and Philadelphia report an excellent demand for textile goods of all kinds, but textile manufacturers are complaining loudly of narrow margins and active competition. The disposition of the tariff question will in a few days bring relief to large manufacturing interests. Makers of steam-engines and steam appliances have, within the past thirty days, largely increased their orders for summer delivery. It is stated upon the authority of some of the largest makers in this line that the demand for machinery for steam-power was never so large as at present; quite a number of large concerns are overcrowded with work, and this condition of things will probably continue until late in the summer. The production of anthracite coal is maintained at the rate of about 100,000 tons per day, and the bituminous output throughout the country is fully up to that of last year. Coke-ovens are being built in every locality where coking-coal is found, the demand for coke having increased very greatly within the past year, owing to the rapid spread of manufactures in new sections.

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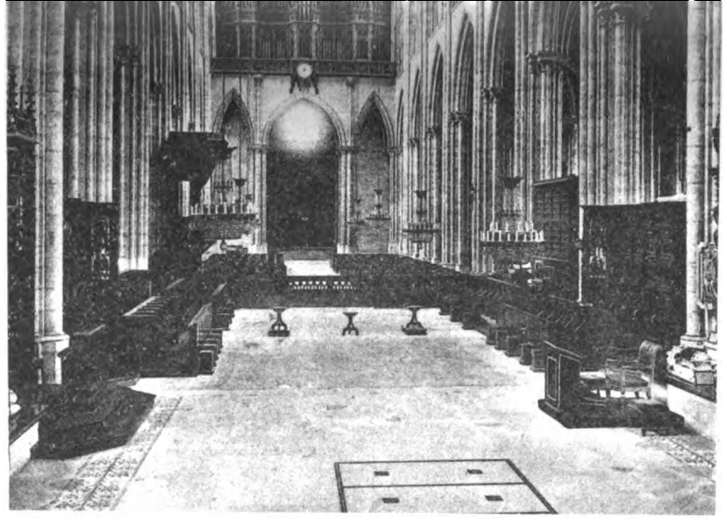
II

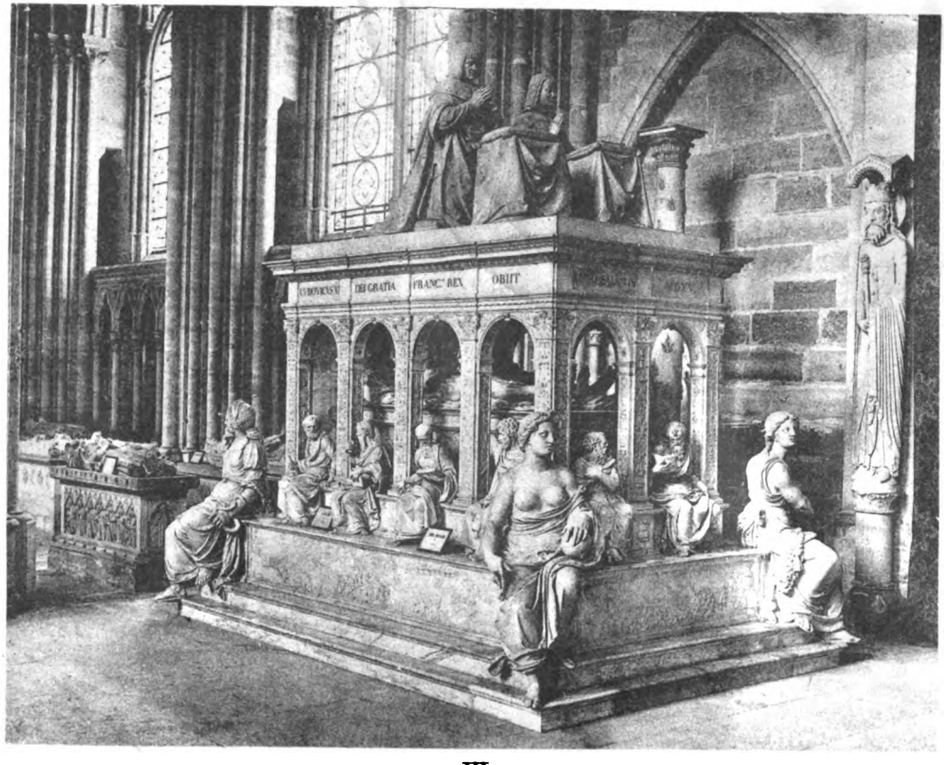
THE NAVE.



II

IV

TOMB OF
LOUIS OF ORLEANS
AND
VALENTINE OF MILAN.



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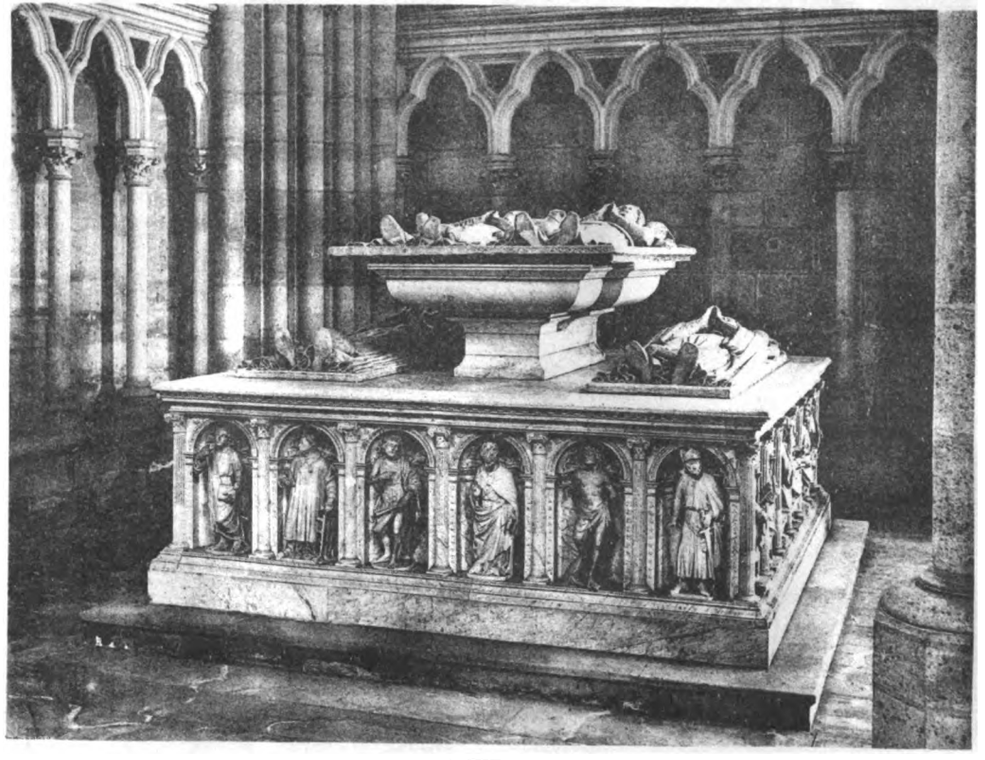

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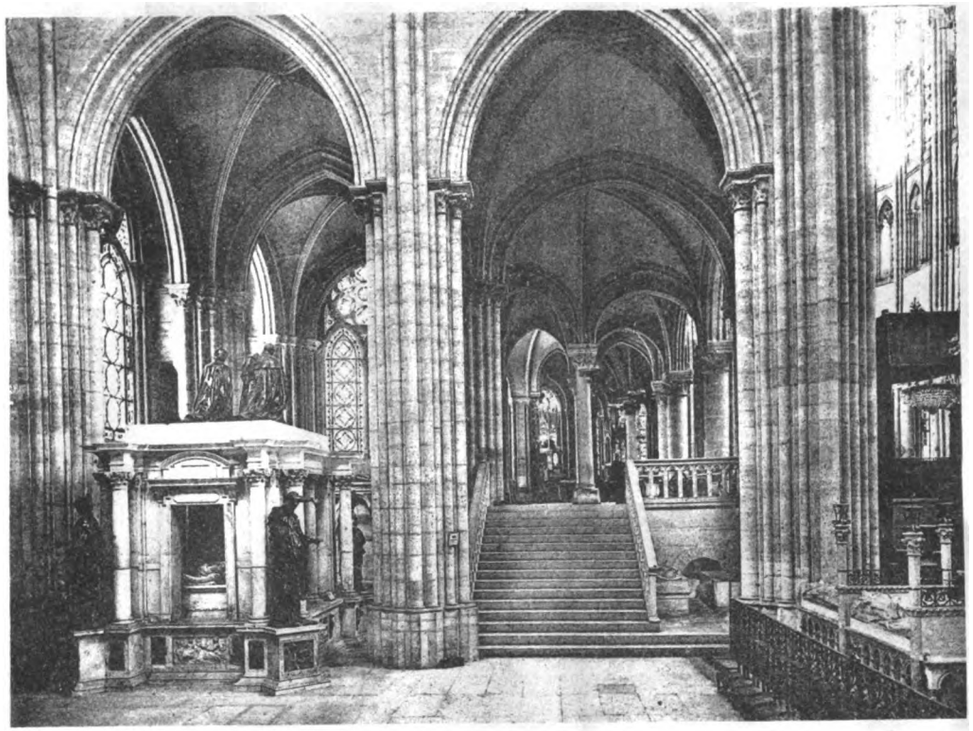

I

III

TOMB OF LOUIS XII
AND
ANNE OF BRITTANY.

THE ABBEY OF ST. DENIS

I

THE APSE.

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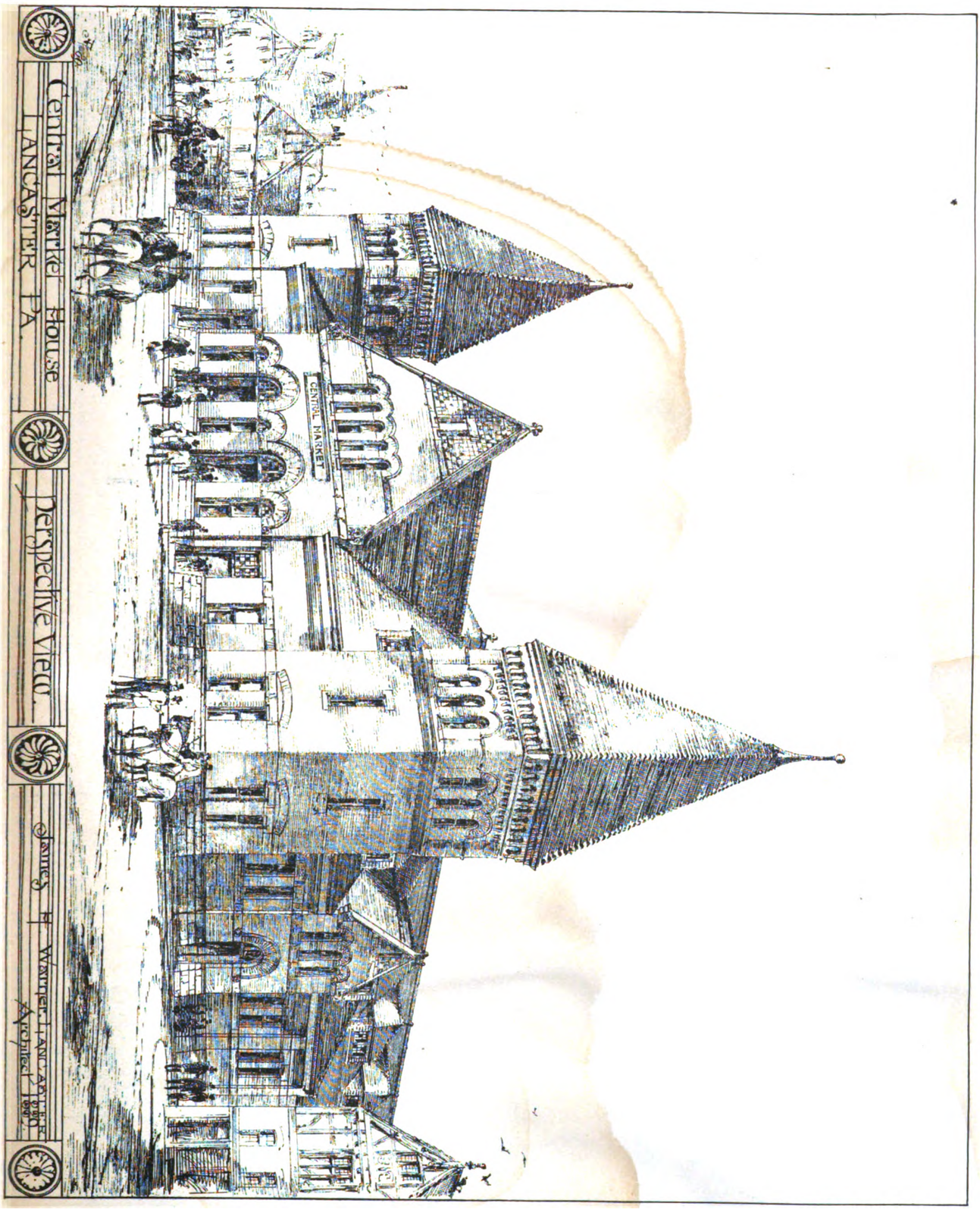

Central Market House
LANCASTER PA.
Perspective View.
James H. Windrim Architect
LANCASTER PA.
1890

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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MAY 24, 1890.

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THE city of Shreveport, Louisiana, according to the *Engineering and Building Record*, has entered into a contract with a private firm, Messrs. Samuel Bullock & Company, under which the latter agree to construct and maintain at their own expense, not only a system of water-works, but also a system of sewers. The firm, by its contract with the city, enjoys for thirty years the exclusive right to supply the inhabitants with water and sewerage, and prices for each service are fixed in the agreement. The prices for water are certainly low, the maximum rate for a ten-room house being six dollars a year, for a stable for one horse four dollars a year, and so on, so that the citizens do not need to complain of the monopoly, and at the expiration of the thirty years term the municipality has the right to purchase the works, at a price to be determined by three appraisers, one chosen by each party to the contract, and the third by the other two. The inhabitants are not compelled to make use of the public water-supply at present, but the city agrees to rent one hundred and six fire-hydrants during the term of the agreement, at the rate of fifty dollars a year for each hydrant. The contractors, in return for this payment, furnish not only water to the hydrants for extinguishing fires, but supply water, free of charge, for flushing sewers, and for all public parks, fountains, schools and other public buildings; and, if the city should wish for additional fire-hydrants, they are to be furnished and supplied with water for forty dollars a year each.

THE sewer agreement covers the construction of two trunk-lines of sewers, with laterals, which are to penetrate into all portions of the city supplied with water by the contractors, and are to be extended with the extension of the water-supply system. The sewers are for house-drainage only, storm-water being excluded, and are to be all pipe-sewers, automatically flushed, after the Waring system. The city makes no provision for compelling the inhabitants to pay for connecting their houses with the sewers, but, in place of this, agrees to pay the contractors thirty-five hundred dollars a year in return for the privilege of connecting and draining all the public and private buildings into the system shown on the plan which forms the basis of the agreement. If any extension of the system is made, the city agrees to pay seven per cent a year on the net cost of the extension, in return for the privilege of using it to drain the buildings near it. To protect the contractors' property, special ordinances are established, making it a misdemeanor to place obstructions in the sewers, and the use of cesspools for the disposal of house-wastes is prohibited. Altogether, the arrangement seems fair to both sides, and likely to be profitable both to the city and the contractors. As every one knows, the construction and maintenance of water-works is one of the safest and most steadily profitable investments of money that can be made, and there seems to be no reason why the establishment of sewers should not be equally certain to bring a good return. In fact, an investment in properly-built pipe-sewers is safer than in water-works, as a drainage system is much less liable than a supply system to accident by bursting of pipes, failure of dams or reservoirs, and so on; while people who have been put to the endless torment and expense incident to the attempt to dispose of wastes, in a house with public water-supply, by means of a cesspool, may be relied upon to use the sewers as fast as they can be extended to them. The connection from the house to the street sewer would rarely cost as much as a cesspool with the drain leading to it, and, at the price which the city of Shreveport agrees to pay for the use of the sewers, the cost per head is only a fraction of a dollar per year — a mere trifle in comparison with the cost of pumping out cesspools.

IN a very large number of our towns, even where the water-works are in the hands of the public authority, we believe that sewers might be built and maintained by private enterprise, where the cost is beyond the reach of the city finances, to the saving of hundreds of precious lives, and the infinite benefit of the citizens. The two principal difficulties in the way are the necessity, in many cases, of seeking an outfall for the main sewers through the territory of a neighboring, and perhaps unfriendly, town, and the legal quibble about the right of a town to give any person or corporation a monopoly in its streets. If these could be overcome, which could most readily be done by an Act of the Legislature, explicitly empowering towns to acquire rights of way through other communes, and to convey franchises for sewerage systems, we have long been convinced that the money would be raised without difficulty, or rather, that capitalists, large and small, would rush to avail themselves of every opportunity for an investment so solid, so near at hand, and so surely profitable. Just at present, the most favorable place that we know of for such enterprises is in the district served by the Metropolitan system of drainage, the construction of which has just been begun in Eastern Massachusetts. This Metropolitan system provides an outfall, and one main sewer, for each of the towns in the Charles and Mystic River valleys, but nothing more, and, in order that the sewer may be of the slightest use to the towns through which it passes, they must build their own drainage network to connect with it. For most of the towns, this is a financial impossibility, since, even if the money could be borrowed, the rate of taxation, which is already very high in the towns about Boston, would have to be raised so much, to pay the interest on the borrowed funds, as to drive the well-to-do inhabitants away, leaving the town poorer than ever. In this dilemma, the intervention of private capital would not only be a great relief to the towns, but would enable them to secure at once the advantages which the Metropolitan system was intended to afford them; and, under an arrangement similar to that at Shreveport, enough capital could be raised in Boston in a few days, as we think, to carry out complete drainage works in the closely-settled portions of the whole Metropolitan district. Most of the inhabitants of the district are tolerably well-to-do; they all have the use of a public water-supply, and nearly all of them have to pay from six to twenty dollars a year for having their cesspools emptied. We know of an instance in the district where a householder had to pay the public cesspool-cleaner twelve dollars for pumping out his cesspool, and had to have it done every two weeks, to prevent its contents from overflowing back into his cellar. This, which was at the rate of more than three hundred dollars a year, for a house of quite moderate size, was undoubtedly an extreme case, but the opportunity for securing sewer drainage at a cost of two dollars a year per house, which is about the Shreveport average, would be hailed with delight throughout the district; yet at that rate the Shreveport Sewerage Company receives an excellent return upon its investment. In the Massachusetts Metropolitan

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district the outfalls for the local systems are excellently provided for by the Metropolitan system itself; and if the towns could be authorized to grant franchises, and would do so judiciously, they might have their sewers built, their population, and the value of their real-estate, materially increased, and their public health greatly improved, without the expenditure of a dollar from the city treasury, simply by forbidding the use of cesspools, and authorizing the Sewerage Company to collect, for the privilege of drain connections, an annual assessment, which would, in most cases, be far less than the yearly present expense of emptying the cesspools and vaults.

THE unfortunate Commissioners who have in charge the erection of the Lowell City-hall appear to be in hopeless trouble. It will be remembered that on the day before the contracts were awarded, and after the bids were all in, one of the bidders "discovered an error" in his figures, the correction of which brought his tender a little below any of the others, and he was awarded the contract. The successful bidder was a man from another town, who was reported to be intending to employ outside mechanics to do the work; and the local voters exercised, in consequence, so much pressure against him upon the City Council that the latter voted not to appropriate the money necessary to carry out the building; and the Commissioners, finding that there was no hope of getting the city to carry out its part of the agreement, voted to rescind its previous action in awarding the contract, and to have new plans prepared, for a building which could be erected for the sum available without a new appropriation, and invite tenders again. The bidder to whom the contract had been awarded, however, thought, with reason, that to rescind the vote, and take away his contract, without his consent, was not so simple a matter as the Commissioners appeared to believe; and he announced his intention of requiring that the agreement with him should be fulfilled, and gave notice, in the usual form, that he was ready and willing to perform his part of the contract which had been entered into with him, and should claim the performance of the other part. What will be the result of the affair can hardly be predicted, but it is safe to say that all the blame of whatever happens will be thrown on the Commissioners, who seem to have done simply and exactly what was required of them, that is, to procure plans and proposals, and to accept the lowest tender; and who, in carrying out their duty, have been already made to appear accessory to a questionable tampering with the bids and principals, in an unpatriotic attempt to take the work from citizens of Lowell, and give it to foreign mechanics; and will now have to bear the additional charge of having involved the city in a serious lawsuit, without having advanced in the least the work which they were appointed to carry out. If the head that wears a crown lies unhappily, what shall be said of the heads that wear the honors of municipal appointments?

FIRE AND WATER, in answer to our protest against its assertion that "some architect" was probably responsible for the building of floor-beams into flues, which caused the destruction of the palace at Laeken, very graciously retracts its opinion, and concludes that, after all, it must have been the builder and his men, and not the architect, who put the timbers into the flues, and that the architect probably provided in the contract that they should not be put there. Simple as this seems, we believe that it is the first time that we ever saw in any public print an admission that, when a builder violates his contract, and fills his pockets by so doing, it is he, and not the architect, who does the bad work. A few days ago the newspapers set up a terrible moan about a lunatic asylum that was burned, and wondered "when architects would learn how to make such structures incombustible." The trifling circumstance that there is not one decent architect in Canada or the United States who does not know perfectly how to make lunatic or other asylums fire-resisting up to any desired point, and the additional one that real architects seldom have anything to do with public asylums, were not even mentioned; and, of course, the readers of the papers concluded that architects, as a body, were not possessed of the rudiments of the art of construction, and they must, in consequence, be an ignorant and incapable lot. Much as the profession dislikes to make claims for itself, it is time, in the interest of the public, that a distinction was made between the builder and the architect, and between the real architects and the ignorant rascals, smuggled in by bribery, favoritism, or political influence, who do so large a proportion of public work.

THE architect's business, it cannot be too often repeated, is to design and plan, with reasonable skill, the buildings which are intrusted to him, and to write, with reasonable care and knowledge, the specifications on which the contract is based. He has also, as part of his full service, to visit the building often enough to direct in difficult or unforeseen points of construction, and to keep in hand the general guidance of the work, so that the owner may not suffer through the lack of provision for the due sequence of the different portions of the complex undertaking. Beyond this, the architect assumes no responsibility whatever. If the builder violates his contract, he does so at his own risk, and he is legally and morally bound to rectify his fault, whenever discovered, no matter what may be the trouble and expense which he must incur to do so. This would hardly seem to need explanation, were it not that dishonest builders find it exceedingly profitable to disseminate the impression that the architect guarantees their work; and that, when they commit some outrageous cheat, if the architect does not leave his proper business, and lay hands on them before they get the fraud covered up and concealed, he, and not they, must pay for having their botched work subsequently made good. The convenience, to the thieves, of a theory by which, if a pickpocket could transfer another's wallet to his own possession, without being detected in the act, he would be entitled to keep the money, while the judge of the court in whose jurisdiction the transfer took place would have to reimburse the loser out of his own pocket, is evident; and it is simply an extension of this principle which is, in this country, enriching the cheats in the building trades, at the expense of the architects and the honest builders, and is depriving the community of the most valuable part of the service which architects are, by training and experience, qualified to render, by keeping them, under terror of confiscation of their slender earnings, constantly employed in police duty, when they might be carrying the science of construction, and the beautiful art of architecture, to a height such as neither of them has yet reached.

THE official deliberations of the French Commission for the study of a question of a diploma for architects have resulted, after five meetings, in the rejection, by a vote of fifteen to three, of the proposition to require architects to obtain, by examination, a diploma before engaging in practice, and the rejection, by a vote of eleven to six, of the idea of instituting a voluntary examination for a diploma. The discussion was carried on very earnestly, and there seems to be no doubt that several who would have voted for the obligatory diploma at the beginning changed their opinion through the force of the arguments presented by the other side. Quite unexpectedly, the discussion brought out the fact that nearly every member of the Commission had at heart the wish to see provincial schools of architecture established, and, on the dissolution of the Commission by its official head, the Minister of Fine Arts, it was immediately reconstituted as an informal assembly, and, meeting a few days later in this capacity by invitation of the Minister of Fine Arts, it voted unanimously "to request the provincial societies of architects to study, in concert with the public authority, the means of developing or creating schools of architecture." We are sure that every architect will be pleased at this unforeseen termination of the work of the Commission. After all, education will do more, both for architects and the public, than diplomas, and no more effective means of promoting true progress in art could be devised than the establishment of several good schools of architecture, acting in friendly rivalry.

THE contents of the Castle Museum at Nuremburg, which belongs to the city of Nuremburg, are to be sold at auction in Cologne on the 9th of June and the succeeding days. It is hardly necessary to say that the collection is one of the most remarkable in Europe, and, while it contains, perhaps, no very beautiful objects, it is probably unrivalled in curiosities of historical interest. Tourists will remember well the collection of instruments of torture, particularly the "Maiden," with its lining of spikes, which would make a fine piece of bric-à-brac for an American country-house; but there are also curious old manuscripts and other objects.

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RELIGIOUS ARCHITECTURE.[1] — VII.

III. RELIGIOUS ARCHITECTURE OF ANTIQUITY. — GREECE.

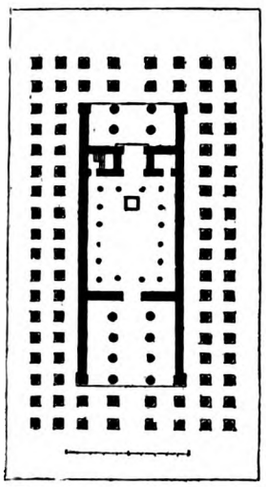

Fig. 3. Plan of the Temple of Diana at Ephesus (6th Century B. C.).

BY the side of the ancient edifices noticed above were numerous temples built on a different model, which has been designated under the name of the Ionic order. Though no precise date can be assigned to the origin of this order, it is universally conceded that it appeared later than the Doric. It has already been pointed out that the column, which was made heavy and short by the timid architects of early times, continually increased in height and slenderness as the processes of construction were perfected, and this fact alone would suffice to establish the priority in point of time of the Doric order over the Ionic.

According to Vitruvius and Pliny, the Ionic order appeared for the first time at Ephesus, in the great temple of Diana. It must be remembered that, in questions of this nature, the term origin is employed to designate the moment when an art, or a style, first manifests itself under complete and definitive forms. Up to this point, partial trials have been made, and each day has brought an added degree of perfection or some modification here and there. But none of these partial trials has made it possible to declare that this art, or style, originated at such an exact point, or at such a precise date. Endless discussions would arise were we to go into the minute and, after all, groundless researches on this subject. We shall have occasion hereafter to repeat this observation.

The probability is, in fact, that when Chersiphron and Metagenes built the great temple, at Ephesus, they were able to erect a beautiful, complete, and already perfect example of an order which was afterward universally adopted because it had grown out of the very human need to find something new to revive the artistic impressions.

Did this order, which the ancients termed feminine in contrast to the masculine Doric order, originate wholly on Greek soil? May not some distant prototypes of it be discovered in the countries with which Greece held constant intercourse at this period? Without entering too deeply into details, we will admit, with a large body of archæologists, that the enamels and ivory carvings of Nineveh furnish examples of ornaments, of roses, palmettes and volutes which were features of the Greek style; that the bas-reliefs of Sargon's palace, built in the eighth century B. C., exhibit columns with base and volutes, and bearing quite an important resemblance to the Ionic column; that M. de Saulcy discovered in the Moabite country a capital, of an evidently barbarous epoch, wherein the likeness is striking; and that the pilasters of Thera in Phœnicia display the same characteristics. These facts are all interesting, but they in no way modify the view, which has obtained from earliest times, that it was only on Attic soil that the Ionic order attained that degree of grace and perfection without which it is nothing.

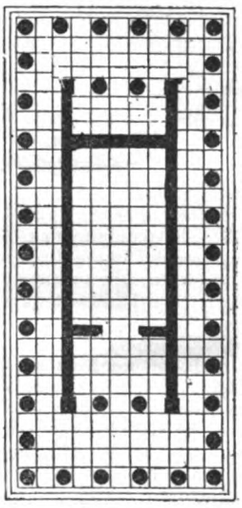

Fig. 4. Plan of the Temple of Theseus at Athens (5th Century B. C.). Scale of 0.0025 per metre.

We shall not insist here on the forms and proportions of this order, which can be studied under special subjects, but will merely point out the chief features which differentiate it from its predecessor. In the temple of Nike Apteros, which dates from the age of Pericles, the column including base and capital is 8 diameters high; now, we have seen that in the sixth century B. C. the Doric column was only 4½ diameters high; the temple of Theseus, at Athens (Figures 4, 5), which was exactly contemporaneous with the Nike Apteros, marked a considerable progress in the matter of proportion, but the column did not yet exceed 5½ diameters. The intercolumnations of 1½ diameters in the Doric became 2 or even 2½ in the Ionic. The bases and capitals are calculated to soften the crudely expressed contrasts of the Doric; the architrave, with its divisions gives greater variety. To sum up, it may be said: "The Doric is short, thick set and powerful; the Ionic is slender, elegant and delicate; the Doric is bare and severe, the Ionic ornate and reaching out for decoration. In its nudity the Doric displays its innermost elements, its framework and fastenings, as the sculptures of Phidias reveal all the bones and muscles of his figures; the Ionic conceals all projections; it clothes its framework in soft, smooth, harmonious forms, as Praxiteles clothed his statues."

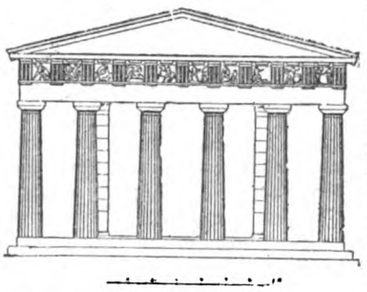

Fig. 5. Façade of the Temple of Theseus at Athens (5th Century B. C.).

Are other proofs required to demonstrate that the Ionic belonged to a more refined and, consequently, to a later civilization than the Doric?

We have enumerated above the chief edifices which mark, in the sixth century B. C., the rise and growth of Greek art; it reached its zenith in the fifth century B. C., the age of Pericles. It is to this period of full flowering that we must assign, for the Doric order, the temple of Theseus (Figures 4, 5), the Parthenon (Figures 6, 7), and the Propylæa, in which the proportion was 5½ diameters. Later, under Macedonian supremacy, the columns were loftier, as in the temple of the Nemeian Jupiter, near Argos, where they were 6 diameters high.

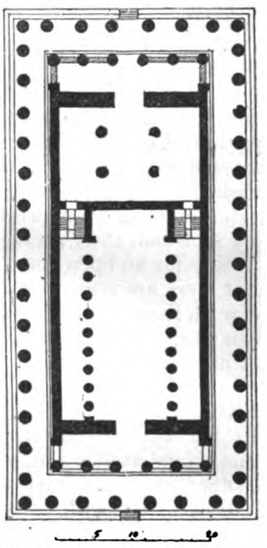

Fig. 6. Plan of the Parthenon at Athens (5th Century B. C.).

To this same epoch belong also, in the Ionic order, the Erechtheium (Figure 8) and the temple of Minerva Polias at Athens. The Ionic proportions have also varied considerably, for in the temple of Minerva, at Priene, the columns were 8 diameters high only, as in the temple of Diana at Ephesus; in the small temple on the banks of the Ilissus the ratio was 8¼, in the temple of Juno at Samos it was 8½, and in the temple of Apollo at Didymi, the temple of Minerva Polias and the Erechtheium at Athens it reached 9.

Such were the two orders constantly employed by the Greeks. The Corinthian, which was more recent, seems,

Fig. 7. View of the Parthenon at Athens.

nevertheless, to have been of quite a remote origin, if traces of it are to be found in the tombs of Theira, in the ruins of the temple of Apollo at Bassæ, and in the temple of Apollo at Branchidæ. It was Callimachus who, in the fifth century

[1] From the French of P. Planat, in Planat's "*Encylopédie de l'Architecture et de la Construction.*" Continued from page 97, No. 751.

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B. C., gave it its final form, such as it appears in all its perfection in the Choragic monument of Lysicrates at Athens. The temple of Ceres and Proserpine was likewise of this order; but the Roman period was reached before it came into general use. Its pomp and wealth must have been especially suited to Roman taste.

It remains to note, as of quite rare occurrence, the Persian order, in which the shafts of the columns were replaced by Persian slaves, and the Caryatic order in which the slaves were replaced by female figures. The Pandroseium at Athens furnishes a very beautiful example of this last variety.

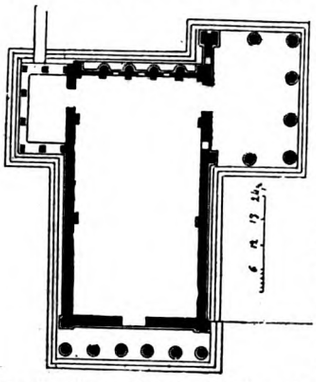

Fig. 8. Plan of the Erechtheium at Athens (5th Century B. C.). Scale of 0.002 per metre.

A few words must be said here concerning a much disputed question, to wit, the manner of lighting the ancient Greek temples. There were no windows in the walls of the cella; the temple of Theseus, the Parthenon and the temple of Agrigentum, like the more recent temple of Nimes, have preserved these walls intact to the very summit; no opening to admit the light is seen in any of them. The few rare exceptions in no way invalidate the rule; the apertures in the Erechtheium are into a dark corridor, and those of the temple of Concord are on the staircases. As a general rule, then, the ancient temples received no light from without.

When light was to be obtained through walls the usual course was to suppress the façade, as in the temple of the Nike Apteros. In ordinary structures, however large or deep they may have been, light was admitted only through the door.

It is certain that some of the temples were wholly closed overhead. It is also certain that in the large edifices the hypæthral disposition, with three naves — the central one *sub divo, sine tecto*, that is roofless, as indicated by Vitruvius — furnished the necessary means of lighting. Although sufficient remains of their framework do not exist, it is, nevertheless, easily seen that their arrangement might be very simple, while providing for an open court in the interior.

But there are some large edifices that were not hypæthral; how were these lighted? Moreover, in the hypæthral temples, the statues, valuables and tapestries arranged around the naos must have been exposed to all the inclemencies of the weather, to rain, sun and dust, which would soon deface them.

Archæologists have fought many hard battles over this subject. On the one hand, a bit of interior cornice with a corona, found at Pæstum, would point to an inner open space; but other explorers have shown that this temple must have been entirely covered. Small glazed lanterns have been suggested as a possible solution of the vexed question, as well as windows in the roofs; panes of glass 11½ inches broad have been discovered. There has been talk of talc and of specular stones furnishing large transparent flags; and many other solutions have been hazarded. The real conclusion of the whole matter is that nothing is certainly known about it, that as yet there have been no discoveries that can settle the debate, and that for the present it is prudent to leave it in the hands of archæologists.

Another question, which has been just as heatedly discussed, has at least the advantage of having found an almost universally accepted solution. We refer to the question of polychromy in the temples. As regards the interiors, the debate was long ago brought to an end by the unearthing of the Pompeiian structures, which proved the constant use of painting among the ancients for interior decorations. But when Hittorf first proclaimed in 1824 the theory that the exteriors of the temples were also painted and stuccoed, the proposition was received with protests not unmixed with expressions of horror. The unanimity of the results now obtained from manifold researches shows that Hittorf's theory was not merely dependent upon chance exceptions for its support, but that polychromy was in general use in ancient times. Ancient texts and the colored representations on antique vases, moreover, corroborate the conclusions which have been generally accepted. It remains only to determine whether beautiful marbles, such as the Pentelic, were coated and painted like common stone. There is little room for doubt in the matter; it may, however, be assumed that, in order not to detract from the beauty of such material with its clear cut lines and pure natural tone, a sort of encaustic was employed which had the advantage of preventing the defacement of the surfaces by sun and rain.

The temple floor was often made of colored stucco; at Ægina it was vermilion.

The steps were perhaps faced in the same way, although no very direct evidence of this has been found.

From the sixth century, the columns were painted. At Corinth the revetment stucco is still to be seen, but it has lost its color; at Metapontum it is yellow, and at Ægina it is of a very pale hue, apparently a light yellow.

The capitals were likewise painted. At Ægina, M. Charles Garnier discovered a deep yellow ochre tint in the stucco, which he thinks was obtained from a primitive red slowly united with the gilts. At Pæstum the palmettes were colored.

The triglyphs of the frieze were painted blue. This may be seen in the Parthenon, as well as in the Sicilian temples and at Ægina. The band, or tenia, connecting the triglyphs was red; the guttæ were blue like the triglyphs.

When the metopes were carved, the foundation was painted red; this can be seen at Selinus. When there was no carving it is uncertain whether the marble was left white, or was colored to bring out the triglyphs.

The mutules of the cornice were always tinted blue; the spaces between them were red, as was also the fillet underneath. The guttæ were left white or were painted yellow. The corona was red; on this background there was perhaps a palmette pattern with leaves alternately upright and reversed, alternately green and blue.

The bird's beak of the rampant cornices and of the antæ capitals was decorated with alternately red and green, or red and blue, leaves; sometimes they were red and brown. Their edges were originally white, but were afterward gilded.

The pediment was blue. On its cyma was a leaf and dart pattern; the darts were blue, while the leaves were painted red or green.

The crowning ovolo of the cornice was in two shades of terra-cotta.

The tiles, the acroteria and the antefixæ were of a brilliant yellow or red. A very peculiar detail is noticeable in the temples of Sicily; the tiles are found here painted upon both sides, which warrants the conclusion that they were visible from the interior, as in the basilicas.

[To be continued.]

ITALIAN TOWERS.[1] — II.

YOU have only to go a block down the Via Proconsolo beyond the Bargello, in the direction of the Arno, and take the street to the right, and in a moment you are out in the square of the Signoria. Nearly everything that ever happened in Florence happened here. We used to come down through it on the way to the *poste restante*, coming into it from the other corner from the Via Calzaoli, for we lived out upon the Via Cavour just beyond the Duomo. Our first glance was always at the tower of the Vecchio. The palace itself is not particularly striking. The exterior is distinctly ugly, and except the court-yard inside with its stucco-covered columns which are the occasion of a withering blast from Ruskin; one or two rooms upstairs; the great hall where Savonarola sat with the council years ago, and where they have grand balls and exhibitions now; and two or three doorways of marble; there is very little inside of particular interest. Of architectural interest I mean, for to the student of political history every room and every stone, nearly, of the building has something of interest to tell. It was built for the Signoria, the governing body of Florence, in 1248, "for their greater glory and security," the records say, and they occupied it with one or two interruptions until Cosimo, the founder of that wonderful line of the Medici, appropriated it as his palace. It was altered and added to from time to time. In 1342 Andrea Pisano, a pupil of Giovanni Pisano, made some alterations for Walter de Brienne. Andrea Pisano, by the bye, executed the bas-reliefs upon the Campanile of Giotto from the latter's designs. He was no relation of Niccola, but probably took his name as assistance in securing clients. It is astonishing to find how deeply Florence, and in consequence the greater part of Italy, is indebted to Niccola Pisano, for all that

[1] Continued from No. 745, page 6.

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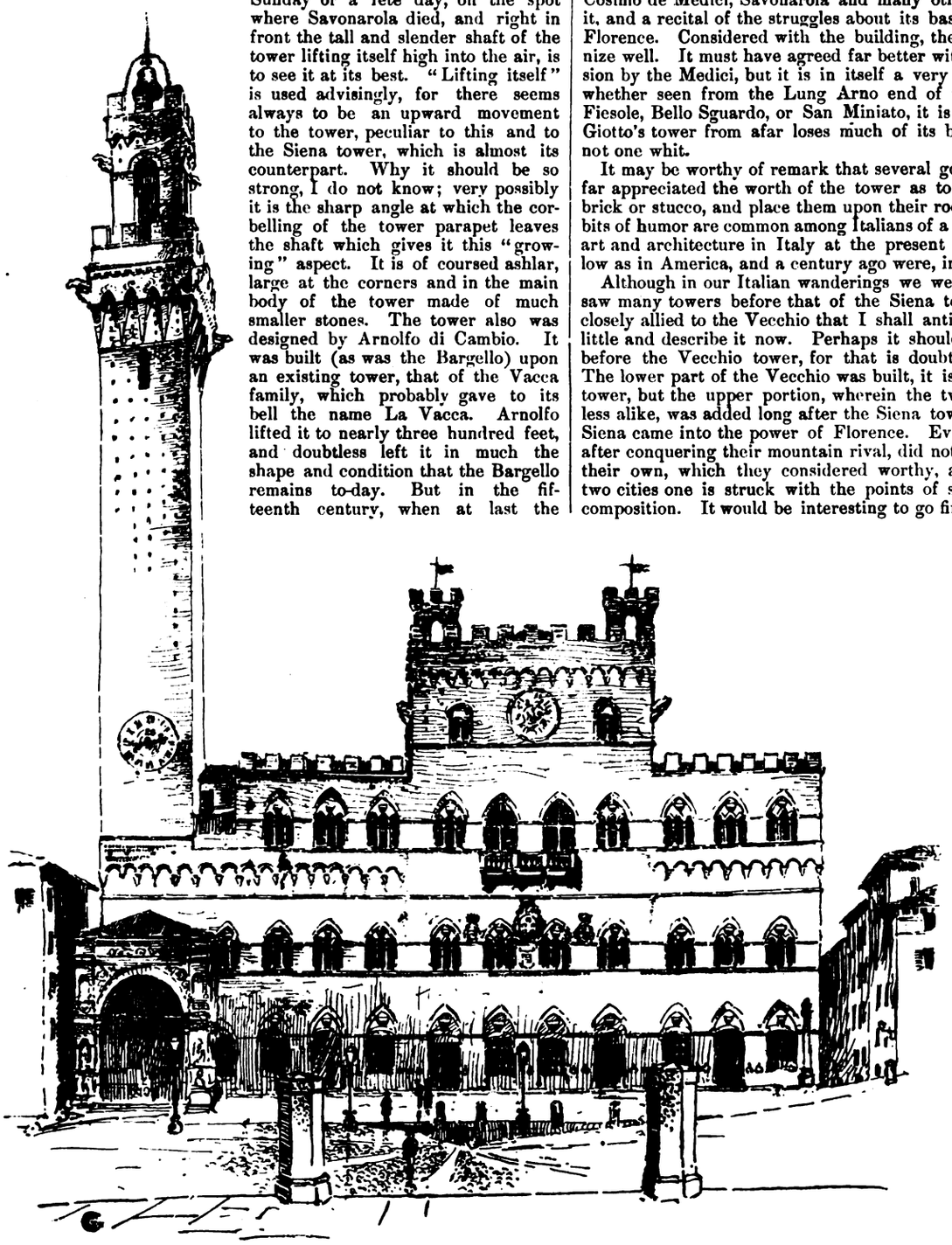
is good in architecture and sculpture. Arnolfo di Cambio was a pupil of his, and his pupils, together with those of Giovanni Pisano, designed nearly everything of merit that Florence boasts.

But the tower itself is both beautiful and interesting. To come from some side street, dark and damp and cold, suddenly into the Piazza all ablaze with sun, with the great fountain playing, if it be Sunday or a fête day, on the spot where Savonarola died, and right in front the tall and slender shaft of the tower lifting itself high into the air, is to see it at its best. "Lifting itself" is used advisingly, for there seems always to be an upward movement to the tower, peculiar to this and to the Siena tower, which is almost its counterpart. Why it should be so strong, I do not know; very possibly it is the sharp angle at which the corbelling of the tower parapet leaves the shaft which gives it this "growing" aspect. It is of coursed ashlar, large at the corners and in the main body of the tower made of much smaller stones. The tower also was designed by Arnolfo di Cambio. It was built (as was the Bargello) upon an existing tower, that of the Vacca family, which probably gave to its bell the name La Vacca. Arnolfo lifted it to nearly three hundred feet, and doubtless left it in much the shape and condition that the Bargello remains to-day. But in the fifteenth century, when at last the Ghibellines came into power, the upper part with its forked merlons, was added, and from the heavy and sombre tower it was changed to one of great beauty and lightness. Around one of its four columns an iron staircase winds to the top, one of the dizziest places in all Italy.



The Palazzo Publico, Siena.

It was a difficult tower to sketch, for all the itinerant venders in Florence are congregated in that square, and they flock to an Anglo-Saxon as crows around a bewildered owl. Then there were more or less English and American tourists who looked over our shoulders and made remarks in our native tongue which we tried hard not to hear. It is not a square tower, but is several feet wider on the sides than the front. This peculiarity would hardly be noticed, however, unless one counted the merlons or the corbels below. The idea that a tower should be square probably never entered Arnolfo di Cambio's head.

I think the size of the stones in the tower one of its greatest charms — the size and the shape. Of course they vary, but the great mass of them seem very small, hardly larger from below than brick, and they are cut so as to be almost cubical. The courses are laid rather irregularly, too, and are not always strictly horizontal.

Aside from its architectural merit the tower is full of interest. Cosimo de Medici, Savonarola and many others were imprisoned in it, and a recital of the struggles about its base would be a history of Florence. Considered with the building, the tower does not harmonize well. It must have agreed far better with that before its extension by the Medici, but it is in itself a very satisfactory tower, and whether seen from the Lung Arno end of the Uffizi arcade, from Fiesole, Bello Sguardo, or San Miniato, it is always very beautiful. Giotto's tower from afar loses much of its beauty, but the Vecchio not one whit.

It may be worthy of remark that several good Florentines have so far appreciated the worth of the tower as to fashion models of it in brick or stucco, and place them upon their roofs as chimneys. Such bits of humor are common among Italians of a later time. "Popular" art and architecture in Italy at the present day are, if possible, as low as in America, and a century ago were, indeed, much lower.

Although in our Italian wanderings we went to many places and saw many towers before that of the Siena town hall, that one is so closely allied to the Vecchio that I shall anticipate our visit there a little and describe it now. Perhaps it should in justice have come before the Vecchio tower, for that is doubtless a copy of Siena's. The lower part of the Vecchio was built, it is true, before the Siena tower, but the upper portion, wherein the two towers are more or less alike, was added long after the Siena tower was built, and after Siena came into the power of Florence. Evidently the Florentines, after conquering their mountain rival, did not scorn to adapt that as their own, which they considered worthy, and everywhere in the two cities one is struck with the points of similarity in detail and composition. It would be interesting to go first to Siena rather than Florence; for Siena is in every way the older city now. To us, coming up from Florence where we had been for several months, the feeling that we had reached the Hub of Tuscany was very strong. The essence of Florence was there, the narrow streets, the overhanging eaves, the wrought-iron banner standards, the Palazzo Vecchio and the Duomo were all in Siena in an intensified form.

It was a raw, windy March morning when we came into the semicircular Piazza di Campo, on the straight side of which the Palazzo Publico, with its tower, stands. It is always windy in Siena, by the bye, and the wind draws through the long and narrow streets which are often but tunnels, with an earnestness of purpose which is truly appalling at times. And all the women of Siena, by the bye again, wear the most enormous hats of plaited straw — quite two feet and one-half in diameter as to brim, and with the merest apology as to crown. I think the connection between these hats and the Siena winds was the first thing that struck us there.

But to come into the Piazza di Campo again. If you enter from the side towards the Cathedral, you will go down a flight of steps and under the first stories of the encircling palaces by a vaulted way and come out opposite the palace. It takes nearly the whole diameter of the semicircle, and the two wings bend a little and reach toward the centre of the Piazza. It is all of brick, of long, narrow, dark red brick, much like the old Roman, but a little shorter and thicker. At the base of the tower is a marble chapel, the Capella di Piazza, somewhat after the plan of the Bigallo in Florence, and erected as a sort of thanksgiving offering to the plague for killing only thirty thousand of the good people of Siena.

The tower itself rises grandly above the left wing of the building.

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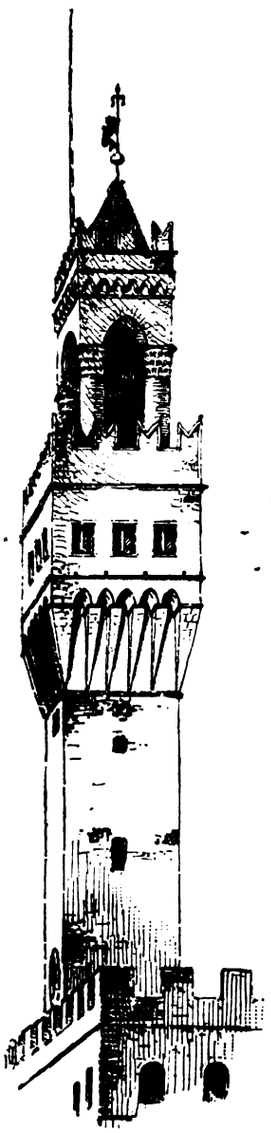
The red brick, of a lighter shade than the body of the building, gives it a warmth that is very pleasing, and all the length of the tower, four or five feet apart vertically, and every five or six courses of brick horizontally, are little square holes — probably left for the staging timbers — at least, that was the only explanation ever given me in Italy that seemed in the least degree probable.

The Roman wolf, which occurs all over Siena as the emblem of its former dependence upon Rome, is very prominent on the tower, and rather in the guise of a gargoyle, too. Evidently, the motive came from the North, for it is quite foreign to all Italian art. They rarely grew depraved enough in Italy, even in their darkest periods of art, to perpetrate gargoyles.

FROM THE PALAZZO VECCHIO FLORENCE DEC 13 1886

The battlements, unlike those of the Vecchio, are square, for when the tower was built — between 325 and 345 — the city was probably a member of the Tuscan-Guelph Confederation. It was in its golden epoch then, and, as was usual in the times of greatest prosperity in Tuscany, there was continual fermentation and overboiling of factions and parties.



The Palazzo Vecchio, Florence.

Every tower almost in Italy has its pet name, and this is called La Manzia, and there used to be a stone figure of a man upon it, who struck the hours upon the bell, and who was a sort of popular idol with the Sienese. The man is gone now, and the bell is supported by four stout wooden spars, much like the davits of a ship's boat, and the hours are told in the ordinary prosaic way.

The change from brick to stone in the upper portion of the tower is striking. The stone is of a grayish buff, much lighter in color than the brick, of course, but the large blocks of stone seem a little out of place above the brick. There is a solidity and strength given by it, however, which would not have been attained by the brick alone.

There is a narrow and exceedingly dark staircase leading to the top, and, once there, there is a "single-star" Baedeker view. With so many other beautiful views in Siena, however, from points so much more accessible, one hardly needs to make the climb.

All in all, the Florentines, when they added their top to the Vecchio tower, improved upon the Siena model. Up to the first parapet, Siena's has the best proportion, but above there she must yield to Florence, for the round columns, with their richly-carved capitals, and the finished top covering the bell, are far more pleasing than the rather heavy upper story, with its afterthought in bell-hanging, upon the Siena tower.

And now, if you please, we will leave Siena for a time and come back to Florence, and, once more in Florence, let us look, for a change, at the tower ecclesiastical.

The civil towers throughout Tuscany are, as a rule, superior to the buildings of which they are a part, while in the case of the finished churches the reverse is apt to be true. Probably, with such an endless number of church campaniles, it is inevitable that many of them must be bad or indifferent, while the civil towers are less numerous, and had, in general, much more care and time bestowed both on their design and construction.

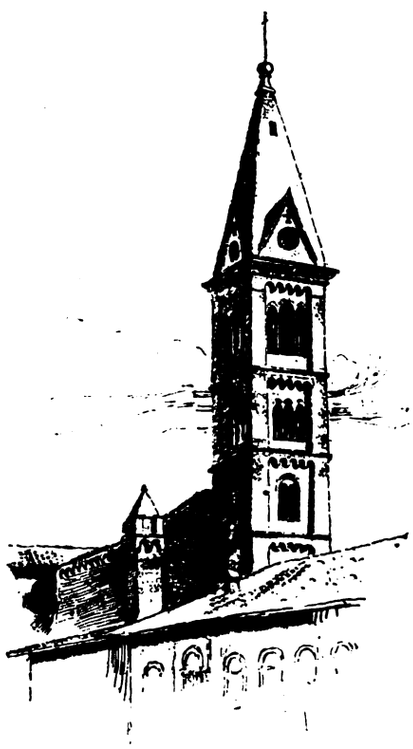
In Florence the same rule holds. The bad church towers outnumber the good, but, despite that, there are more good towers in Florence than in any of the Italian cities that we visited.

We did not sketch any of them until we had been in Florence many weeks. We looked at them critically, and very soon found how easy it was to find reasons for imaginary good points which we chose to consider as existing in many of them, and how easy to prove nearly any of them wholly bad. But we were, on the whole, very lenient. We had come to Italy to admire and learn, and we should have been neither true critics nor students had we done otherwise than admire, at least.

I think the first tower we noticed especially was that of Santa Croce. Let me mention here that Giotto's campanile is always considered apart from the others in Florence. Santa Croce, too, seemed to be a popular tower with every one — at least, until it was found to be a relatively modern restoration, and then almost every one dropped it at once. And, after looking at it a few times, we decided, all prejudice aside, that it was not particularly good — hardly better than the little tower of San Marco, which we sketched one day from the cloisters of the convent where Savonarola lived; the cloisters where he doubtless aired himself mornings, and where you generally find now three or four American or English girls sitting on little portable stagings, and copying Fra Angelico's *lunettes*, which are above the four doors at the corners of the court.

This little tower of San Marco is all covered with stucco, and it looks very neat and smooth. If the stucco were only scraped off, it would be a very pretty little towerlet indeed, although it is exceedingly simple.

But, passing by this with a glance, and continuing to the west, you are almost sure to come out before Santa Maria Novella, and if Santa Croce, the Franciscan church, seemed to be conspicuous by its tower, the Dominican church of Santa Maria Novella did not, for its tower is, everything considered, the most thoroughly satisfactory in all Florence.



Santa Maria Novella, Florence.

It is fitting that it should have more of beauty and dignity, more outward show and display, for it but carries out the spirit of those two great brotherhoods, the Franciscan and the Dominican. Decidedly, the Church of Santa Maria Novella stands for St. Dominic, and Santa Croce for St. Francis. Santa Maria Novella is grand, imposing and beautiful, and asserts its qualities in every line. Santa Croce is impressive from its barrenness and silence, but for no other reason on earth except the possession of the most deadly, unholy and villainous chill that ever entered into grave or tomb. It is the coldest place in the world, and if St. Francis's cell was half as damp and frigid, all doubts as to the genuineness of his supernatural sanctity are removed, for no mortal could have supported life under such circumstances for any length of time.

But to return to Santa Maria Novella, the Dominican stronghold. It is one of the very few churches in Italy in which the composition, entirely independent of exterior ornament, is really worthy of notice, and this, too, applies to the older portion, the rear, and not to the front, which, although striking, is not lovely. But at the rear the church is very pleasing. The transepts, the chapels and the choir all cluster together about the tower in a most charming way; and the tower is simple, dignified and elegant, with a strength which is all that one or two other towers in Florence lack to make them close rivals.

As is the case with most of the Florentine towers, it is hard to

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find a decent vantage-point from which to see it, for from the cloisters of the church which generally afford the best views of the towers, and from which the towers of the Churches of the Badia, Santa Croce, San Marco and San Spirito all look their best, the Santa Maria Novella tower is too close, and in almost absolute elevation. After much walking about, we finally climbed upon a low wall against the railway station — a most wily move, for, once there, we were out of the reach of all critical and admiring crowds — and there we got our most satisfactory view of the tower and the church as well. It is a tower of small ashlar, sometimes coursed and sometimes random, and all time-stained and moss-grown into the most beautiful colors — a general tone of umber, which shades at times into gray. Its openings are much like the conventional Italian ones: two at the lower course, then next above three; but instead of four for the next in height, which is apt to be the case, the three are simply enlarged, and the centre one is semi-circular, while those at the sides are pointed.

Above the cornice, which shows the memory of the Classic which Italy never lost, the tower runs to a sharp point. This is managed, too, with great skill by the introduction of the gables on each side just above the cornice line, and by stilting the whole spire, too, for about two feet before commencing the drawing in. Had the designer of St. Mark's, in Venice, adopted something of the same idea in finishing his tower, the effect would have been much more pleasing.

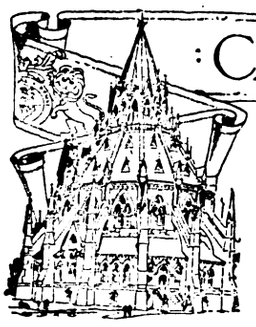
The spire is of brick covered with cement, and all stained the same rich browns and grays by time. Color is everything in Italy — a fact we fully realized on getting back north of the Alps — and the blackness and grime of Paris and England were greatly intensified after six months south of the Alps.

The rising of the tower from one of the transepts is very common throughout Italy. I think it is universal in Florence. On the opposite corner of the same transept from which the tower rises the treatment is quite unique.

The architects of the older portion of the church and the campanile were, first, Fra Listo and Fra Ristono, two Dominican monks, and, after them, Giovanni di Campo, who, in 1349, finished the work which they had begun in 1278. To whom among them the credit of the tower chiefly belongs I do not know, but whether to the Dominican friar or to Giovanni di Campo, he deserves to be remembered for one of the most beautiful towers of the best period of Florence.

GEO. CLARENCE GARDNER.

[To be continued.]



THE BILL FOR THE REGISTRATION OF ARCHITECTS. — THE TORONTO ARCHITECTURAL GUILD'S SCHEDULE OF CHARGES FOR THE USE OF ARCHITECTS.

THE act passed by the Ontario Provincial Parliament is now printed and before the public, and it is disheartening to see how the Government, who fathered the bill, has ruthlessly cut and chopped it about so that its main objects are defeated. After hours of real hard labor on the part of those who drew up the bill, the Government took it in hand, and in perhaps half an hour so disfigured the draft that it is hardly to be recognized as the offspring of the Ontario Association of Architects.

The act is too long to give here in full, but I propose to give an epitome of it, and show wherein it differs from the act drawn up by the Association.

The main points of the act, as submitted to the legislators, were, first, "the protection of the public interests in the erection of public and private buildings in the Province," and, secondly, "to ensure a standard of efficiency in persons practising the profession"; and this is what the preamble of the bill, *as* passed, states as the nature of the bill. But subsequent clauses of the act go to undo these very particulars.

"Whereas it is deemed expedient for the better protection of the public interests in the erection of public and private buildings in the Province of Ontario, and in order to enable persons requiring professional aid to distinguish between qualified and unqualified architects, and to ensure a standard of proficiency in the persons practising the profession of architecture in the Province, and for the furtherance and advancement of the art of architecture, therefore Her Majesty, etc., enacts as follows." So far so good, and then come the usual clauses about the name of the act, the incorporation of the Association, their legal standing, and so on.

Clause 5 refers to the "Council," and Clause 6 arranges for its composition, which shall be of nine persons, to be appointed by the Lieutenant-Governor within a month after the passing of the act. These nine persons must have been residents and practisers of the profession for at least ten years in the Province, and their times of meeting are decided on by this clause.

Clause 7 regulates that the first three names mentioned shall hold office for three years, the next three for two years, and the remaining three for one year.

Clause 8. Election by ballot.

Clause 9. Qualification for election to Council.

Clause 10. All elected members hold office for three years, except as afterwards provided, five to form a quorum.

Clauses 11 and 12 regulate procedure in case of resignation or death of members of Council, and elections to fill vacancies.

Clause 12. As to settlement of disputed elections.

Clause 13. Meetings of Association and Council.

Clauses 14 to 16. Regulation of meetings.

Clauses 17 to 19. Fees to Council for attending meetings, appointment of registrar and other officers, and salaries to be paid to them.

Clause 20. Power and authority of Council to appoint examiners for students desiring emolument; to make rules regulating admission of students and architects, to settle fees, and to arrange as to terms upon which it will receive certificates of other educational institutes of the Province.

Clause 21. Students are exempt from the preliminary examination who have matriculated in arts in any university in Her Majesty's dominions or in the Ontario School of Practical Science.

Clause 22. "Any person practising the profession of architecture on the coming into force of this act may become a member of the Association by causing his name to be registered . . . within three months of the appointment of registrar," and by paying fees, etc.

(The original form of the act excluded all architects who had not been in practice for two years in the Province prior to the passage of the act.)

Clause 23. Applicants for registration as architects must be twenty-one years old, and have been students properly articled for five years.

Clause 24. Regulations for students who desire to enter the profession: their registration, payment of fees and examinations.

Clause 25. (This is one against which the Association has kicked and kicked in vain.) "From and after the first day of July, 1890, no person shall be entitled to take or use the name or title of '*registered architect*,' etc. . . . unless he is registered."

(The original document had the word "architect," intending that this word should stand as a guaranty of ability; but now, according to the act, any one may still call himself an "architect," though he may not use the word "registered." But who wants to call himself, or stick up on his name-plate, "registered"; might as well be a monthly nurse or a baby-farmer. "Any person not entitled using this name shall be liable" to fines, which are stated.)

Clause 26. Duties of the registrar.

Clause 27. Punishment for falsification of register.

Clause 28. Punishment of any person for fraudulent representations under the act.

Clause 29. Architects acting as professional witnesses to be paid same fees, etc., as allowed to provincial land-surveyors (*i. e.*, five dollars).

Clause 30. Recovery of debts due the Association.

Clause 31 relates to posting and delivery of notices and documents.

Clause 32. Application of fees and moneys received by treasurer, and investment of same by Council.

Clause 33. Keeping of books.

Clause 34. Keeping of the register.

The act, as drawn up by the Association, contained some clauses which have been entirely rooted out by the Government; clauses of great importance for the purposes of the act, but which, apparently, they considered too important to pass, and therefore expunged them altogether.

Clause 34 of this draft would make it impossible for any man not registered under this act to obtain or recover fees for professional services in any court of law.

Clause 35 makes it unlawful for any city authorities, local boards, boards of works, or other public body in receipt of public moneys, to appoint any unregistered person to the office of building inspector or similar offices, under which inspection and approval of plans for buildings of all kinds would be done.

Practically, this last clause, and the one restricting the use of the word "architect," formed the backbone of the bill as prepared by the Association. The one the Government obliterates, and the other it renders objectionable and almost useless by the interpolation of the word "registered," and why they should have insisted on this it is hard to say, except that possibly they thought they would be doing harm to those architects who are no architects. They have not asked themselves the question whether, by shielding these men, they were protecting the public. They declare their purpose to be that of protecting the public, and then make no attempt to hinder those who do them injury, for who among the public is going to look out for the word "registered" on an architect's name-board. No, they all will see "architect" as heretofore, and will be bitten in consequence. "Registered doctor," "registered lawyer," "registered clergyman": either they are doctors, or they or not; lawyers, or mere adventurers; ministers, or agents of the devil. Why, then, should a man be allowed to call himself "architect" when he is not, or why should a proficient be forced to call himself "registered" in order to ensure his being recognized as an architect. If he is an architect, he is an architect, and, if he is not,

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he should be prohibited by the most stringent measures from abusing an honorable title. He should be subjected to fines and imprisonment, be made unable to collect his fees (for he has no right to them) in any court, and he should be forced to go back to his original trade — contracting, building, scallawagging, or to his washtubs, as the case may be, or anything he likes, for that matter, so long as he ceases to attempt the practise of the art.

The act says nothing about expunging from the register the names of any guilty of such acts as in Her Majesty's dominions would be misdemeanors or higher offences, or guilty of acts, after his registration that would be contrary to the regulations and by-laws of the Association, as was arranged for in the draft. Possibly that power is conceded to the council who can "make all rules, regulations and by-laws necessary for the proper working or carrying out of the provisions of this act," and, if so, such a rule could be made, but the expression of such a regulation in the act itself would have been of greater weight. No mention is made in the act as to the power of the council to fix a tariff of fees, and several other minor clauses are struck out.

The important feature in which there is any value, is perhaps the recognition of students and the rules by which they are to be admitted to studentship under registered architects. Up to the present in the absence of all rules and regulations, just as anybody can set up as an architect, so any boy can be a student, and when, in his *own* opinion, he has been a student long enough, or studied sufficiently, then if he can get a two-thousand-dollar cottage to start upon, he sets up as an architect. Now, however, notice and proof of existing studentship must be given within six months of the passing of the act, and this notice must be accompanied with properly executed articles of indenture for the term prescribed. All new students after the passage of the act must be presented by a member of the council, have their names entered, pay the fees and submit to the examinations, and all who are articled to serve for a shorter term than five years, must make up this full term and pass the examinations before being entitled to register as an architect.

It is intended that the examinations shall be qualifying, and that he who has passed the final shall be considered capable of practising as an architect. Details of examinations, and all rules, regulations and by-laws have yet to be arranged by the council which, at the present time, is non-existent.

To sum up the act, the one thing to be said about it is that it is a step in the right direction. As I said before, it is easier to amend an act than to obtain one, and if the Association will endure patiently the indignity of being "registered architects," they need not endure it for long. Let them accept dry bread, and in due time they will get some butter. "Half a loaf is better than no bread," to most people; but, when by the acceptance of the half loaf you are in a position to secure a whole one, by all means hang on to your demi-quartern.

Several months have passed by since the question of a schedule of charges was brought up at the meetings of the Toronto Architectural Guild, and the Committee have been able to report at last on the result of their labors. The new schedule, which has been in force in a good many offices for some months, has, however, recently been printed in the form of a small pamphlet, convenient for enclosing in ordinary envelopes for the use of clients who desire to know the usual fees and commissions, and this handy little leaflet contains about as complete a schedule as has heretofore been drawn up. By this list a client can see for himself that these architects do not mean to be imposed upon, and made to do a great deal of work for a mere pittance; every class of work is arranged for, from the first interview down to the final settlement and one great point is, that the charges are in all cases just what the work can be done for. Often under older regulations an architect has felt that for his own credit he has been obliged to take a great deal more trouble and do a great deal more work than the remuneration of 5 per cent on that particular building would really pay him for; in other words, he has been obliged to do his work at a loss because his reputation being at stake, he could not afford to let his work be spoiled because he was not getting an equivalent commission, but now he is to receive a commission in proportion to the importance of the work he carries out, and the trouble to which he is put to suit his client's requirements.

The main clauses are as follows:

For plain factories costing $5,000 and upwards, 3 per cent.

For plain warehouses costing $5,000 and upwards, 4 per cent.

For churches, colleges, schools, opera-houses, office-buildings, court-houses, exchanges, city-halls and other public buildings costing $5,000 and upwards, 5 per cent.

For residences costing $5,000 and upwards, 7 per cent, but for plain work which does not require many details, drawings or consultations, 5 per cent.

In all the above classes of work when the amount expended is less than $5,000, the charge will be in excess of the above rates in proportion to the labor required to properly carry out the work.

For alterations . . . charges are in excess of above.

For designing interior fittings, decorative work, etc., from 10 to 25 per cent will be charged.

For selecting tiles, glass, etc., 10 per cent.

"Supervision" by the "architect or his deputy" is defined as such inspection as he finds necessary to ascertain whether the work is being carried out in conformity with his designs, and to enable him to decide about the amounts due to contractors for the work done.

It is also stated very clearly that all drawings and specifications are the property of the architect. "The client, however, has a right to duplicate drawings on payment of the actual cost of making these copies," and on agreeing that he will not use them for building again, without making an arrangement with the architect and paying commission as set forth, and so on.

The Architectural Guild of Toronto really deserves the thanks of the profession at large, for the issue of such a schedule, and other associations will do well to look into the matter for their own benefit, and I doubt if they can do better than adopt it for their own use in its entirety.

GOVERNMENT ARCHITECTURE IN AUSTRALIA. — WEATHER CYCLES. — THE ARCHITECTURAL OUTLOOK.

SYDNEY, N. S. W.

THE complaint, made in my last letter, that architects in private practice here never get an opportunity of erecting buildings of a public character, has become more general, and a few weeks ago a deputation of the principal architects of the city waited upon the Mayor, to ask him to throw open to public competition the new Market Buildings which the municipal authorities purpose to erect. As Mr. Mansfield, the spokesman of the deputation, pointed out, it was not desired in any way to limit the consideration of the subject to this one work. What was asked was whether designs for large important buildings should not be submitted for competition among the members of the profession. New South Wales is the only part of the world where the designing of public buildings is entirely confided to the officers of a government department. It is not the practice in England, or on the Continent; neither does it seem to be the practice in America. The Mayor admitted that the deputation had made out a good case, and promised to do what he could to further its object. So there is a faint hope that we may eventually see the collapse of the short-sighted policy which is responsible for this unsuccessful and expensive architectural monopoly.

Mr. Egeson, a young meterologist engaged at the Sydney Observatory, has recently revived the old theory of weather cycles. Seasons of heat and cold, drought and rainfall, recur, he tells us, at regular periods, and these periods are indicated with a tolerable degree of certainty, by the increase or decrease of the spots on the sun's surface. His first forecasts, based upon this theory, were not altogether successful in regard to date; but the rains he then predicted came within a fairly reasonable time, and gave him a local reputation as a weather-prophet. Emboldened by this partial success, his next prediction was to the effect that, after an exceptionally heavy rainfall in the first half of the present year, there would follow a three years' drought. At this the "pastoralists," not unnaturally, became alarmed, for, though disastrous floods are not uncommon, in Australia there is nothing the squatters dread so much as a prolonged drought, and one of three years' duration would mean ruin to most of them. The Government astronomers in the various colonies were, thereupon, appealed to, and these gentlemen, by way of restoring public equanimity and asserting their own superior knowledge, publicly derided Mr. Egeson and his theory. That imprudent young prophet had then the temerity to retort that there were, perhaps, many things undreamed of in their bureaucratic philosophy, and then he offered to stake his position, and what little reputation he had, on the result of his predictions. This reply savored so much of a challenge that official dignity felt itself assailed, and Mr. Egeson was informed in a ministerial minute, that, while he remained in the Government service, he would not be allowed to publish any more of his disquieting prophecies. This was some months ago; but the sequel to it all is that, since the beginning of this year, we have had the heaviest and most persistent rains that have been seen for many a day.

It is, in a great measure, the result of the fulfilment of the first part of this forecast that there is absolutely nothing worth noting in the building line this month; if the second part is as literally verified, there will be no architects required here in a little while. But the most dogmatic of scientists sometimes go astray in their calculations, and we all remember Wiggins.

But speaking seriously, the architectural outlook is sufficiently gloomy. Last year, according to the City Surveyor's report, there were 170 buildings erected within the city of Sydney. Now there are, at least, one hundred firms practising their profession as architects in the city itself; and when it is remembered that nearly one-half the work is done by three or four of these, the amount of business which remains to be divided among the others is not, it will be admitted, very great. Of course, to this must be added the various buildings in the suburbs and the country, though the majority of these are erected without any professional supervision. An opportune pupil's premium may also help many a needy architect to eke out a precarious existence, but this is a source of income which it is unwise to rely upon to any great extent; and, as a local professional paper sarcastically remarks, there is not much inducement to

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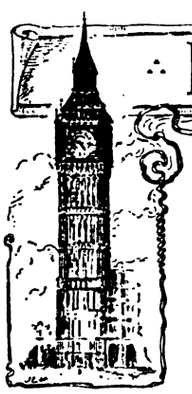
a father to pay a premium for the education of his son in such a liberally rewarded profession as that of architecture.



LONDON

THE COMPULSORY EXAMINATION OF ARCHITECTS. — THE EDUCATION OF ARCHITECTURAL STUDENTS. — THE LONDON COUNTY COUNCIL.

IT will be remembered that at the close of my last letter, I mentioned that a movement was on foot within the ranks of the Royal Institute of British Architects, in favor of the establishment of a compulsory examination for all architects. This movement assumed practical form on the 31st March when there was a crowded meeting at the Institute to discuss the question. The actual resolutions before the meeting were as follows:

"1. That, at as early a date as possible, statutory powers should be sought to establish, as in other professions, a system of compulsory examination to be held by the Institute, and to be extended to all architects hereafter entering the profession, whether as members of the Institute or not.

"2. That when such compulsory examination comes into force, the position of all existing architects shall be completely respected.

"3. That, whether these (Nos. 1 and 2) be carried or not, a poll be taken by voting-papers, in order that under any circumstances the opinion of the entire body of professional members may be ascertained."

These resolutions were, it should be borne in mind, not official, but simply the views of certain private members who were represented by Mr. Connon, of Leeds. These resolutions, it will readily be seen, are, in reality, another form of registration framed, however, in a somewhat less objectionable way. There was a certain amount of ingenuity displayed in their concoction, because the Institute, having imposed a compulsory examination upon candidates for membership of its own body, could hardly object to the extension of this examination to the whole profession. Nor would there have been, I think, any objection to the proposal, if the examination of the Institute had been existing for any considerable length of time. This is, however, not the case. The compulsory examination was established in 1882, and it was only a few months ago that the development into a series of three examinations took place. The Institute, indeed, regard the whole question of a compulsory examination in the light of an experiment, which may or may not have a beneficial effect on English architecture, and, although many have individually very little doubt as to the ultimate result of the experiment, yet to ask for legal recognition at the present juncture of affairs would be simply courting rebuff. This view of the question was admirably set forth by Professor Roger Smith, who moved the following amendment to the resolution:

"That, while not opposed to the principle of compulsory examination as applied to those about to practise architecture, this Institute is of opinion that the difficulty of restricting by statutory powers the practice of architecture to those who have passed an examination is at present so insuperable that it is undesirable to make an immediate application for such powers."

I need not say that this principle of *festina lente* met with the approval of the meeting, and the amendment was carried by a substantial majority, which was subsequently confirmed on an appeal to the general body of members.

I give you these particulars in some detail, as this question of compulsory examination is attracting so much attention throughout the world. The movement in its favor is undoubtedly a wide one, and, therefore, it demands our closest attention. It is not wise, I think, to dogmatically assert, as some do, that registration is the root of all evil. It might have a prejudicial effect on our art; it might, on the other hand, influence it beneficially, and surely in a question of so grave importance as this, it is more prudent to consider the question in all its bearings before joining one side or the other. At all events, this is the feeling which animates many men in England.

The Education Committee of the Architectural Association have issued their report, and it quite fulfils the rumors that were bruited abroad of its drastic character. The main ideas are as follows:

The system of mutual instruction, on which the Association was founded, is done away with.

"Upon consideration it appeared to us that some methodical system of study was essential, and that the need of such a system was emphasized by the recent publication of the Institute programme of progressive examinations.

"While recognizing that many institutions exist where knowledge of great importance to the architectural student can be obtained, we should like to point out that there is no institution in London where all the subjects that go to make up an architect's education are taught, or even suggested to the student.

"We are convinced that the mutual system, which was adopted by the Association at a time when the number of members was small, and when probably nothing else was possible, now presents great disadvantages and difficulties. The teaching under such a system naturally fluctuates considerably in quality, and consistency is almost entirely lost."

The gap thus created is filled by the employment of a staff of salaried teachers, who teach the various subjects in the lecture and class room. This system is supplemented by what the Committee calls a "Studio."

"We have also considered the advisability of establishing an architectural Studio by the Association; and we think it particularly desirable that such a means of instruction should be established, where the principle of design and construction may be worked out together at the drawing-board, an object, in our opinion, of the highest importance. If possible, this Studio should be open in the daytime as well as in the evening, and visitors or instructors should attend at certain stated hours."

The scheme of instruction seems thus to be divided into two divisions, viz., the preaching school and the practising school. Theory will be taught in the one and practice at the other.

Another decided improvement in the scheme is the absorption of "construction" in "design." Hitherto it has been the practice at the Association to teach "construction" and "design" in two absolutely distinct divisions, with the result that students used to devote themselves to one side of their profession, so much so that they were labelled among themselves as construction-men and design-men. I need not say that this divorce of what should be intimately connected produced lamentable results, and it is a matter for congratulation that the evil has, at last, been recognized.

The new curriculum, which the Committee proposes, consists of a four years' course, and is based on a session of thirty-two weeks net in each year. I send a report of the list of subjects, as it may be interesting to compare it with those already at work in American colleges:

CURRICULUM.

INSTITUTE PRELIMINARY EXAMINATION.

(The subjects required for the Institute examinations are printed throughout between inverted commas.)

FIRST YEAR.

LECTURES AND CLASSES TO BE GIVEN ON 32 DAYS, EACH LECTURE OR CLASS LASTING 1½ HOURS.	STUDIO.
12 Meetings. "The orders of Greek and Roman Architecture, their origin, development and applications." "The several varieties of Classic Ornament."	"Geometrical drawing of ancient examples." One example at least to be drawn from actual measurement. 8 Meetings for criticism of drawings.)
16 Meetings. "The nature of Ordinary Building Materials" and "The Elementary Principles of Construction."	"Elementary Construction."
10 Meetings. "Plane Geometry applied to Actual Work: — Projection of Solids and Development of Surfaces."	Freehand drawing.
4 Meetings. "Elementary Physics as applicable to Building." (Mechanics.)	"Plane Geometry applied to actual work."
6 Meetings. The Rudiments of Perspective.	Perspective.
4 Meetings. "Mensuration."	
6 Meetings. Chemistry.	Class for Sketching and Measuring (Saturday afternoons, as at present).
6 Meetings. Geology.	

SECOND YEAR.

LECTURES AND CLASSES TO BE GIVEN ON 32 EVENINGS, EACH LECTURE OR CLASS LASTING 1½ HOURS.	STUDIO.
24 Meetings. "English Architecture from the Conquest to A. D. 1500, and the successive developments of the styles." "The characteristic Mouldings and Ornament of each period."	Design based upon ancient examples. (8 Meetings for criticism of drawings.)
12 Meetings. "The nature of Ordinary Building Materials," and "The Elementary Principles of Construction." (Continuation of 1st year.)	Freehand Drawing.
8 Meetings. "The Calculation of Strengths of Materials and Resistances from data and formulæ given."	"Solid Geometry, Projection of solids and development of surfaces."
8 Meetings. "Land Surveying and Levelling." Field Lessons. "Land Surveying and Levelling." (Saturday afternoons.)	Elementary Color Decoration.
6 Meetings. Chemistry of Building Materials.	Perspective.
6 Meetings. Elementary Color Decoration.	Class for Sketching and Measuring. (Saturday afternoons as at present.)

INSTITUTE INTERMEDIATE EXAMINATION.

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THIRD YEAR.

LECTURES AND CLASSES TO BE GIVEN ON 48 EVENINGS, EACH LECTURE OR CLASS LASTING 1½ HOURS.	STUDIO.
32 Meetings. "The History of Architecture," and "Features, Mouldings, and Ornaments."	"The design and construction of modern buildings." (A certain number of meetings for criticism of drawings.)
16 Meetings. "Materials, their nature and their application in building."	Freehand Drawing.
10 Meetings. "Strength of Materials: — Stresses and Strains," their determination by formulæ and graphic methods.	"Sciography."
14 Meetings. Quantity Surveying.	"Constructive Masonry."
8 Meetings. Color Decoration.	Color Decoration.
6 Meetings. "Sanitary Science," including drainage and water-supply.	Modelling.
10 Meetings. Elementary Natural Philosophy, including light, sound, hydrostatics, electricity, etc.	Elementary Water-color Class. (Saturday afternoons.)

FOURTH YEAR.

LECTURES AND CLASSES TO BE GIVEN ON 48 EVENINGS, EACH LECTURE OR CLASS LASTING 1½ HOURS.	STUDIO.
32 Meetings. "History of Architecture," and "Features, Mouldings, and Ornament." (Continuation of 3d year.)	"The design and construction of modern buildings." (A certain number of meetings for criticism of drawings.)
16 Meetings. Materials and Construction. (Continuation of 3d year.)	"Drawings of ancient buildings from actual measurement."
16 Meetings. "Sanitary Science," including ventilation, acoustics, lighting, heating. (Continuation of 3d year.)	Freehand drawing and modelling, including studies from the life.
8 Meetings. Professional Practice, including the "Measurement and Valuation of Buildings and Materials; Preparation of Estimates; The Legislative enactments relating to Building; Specifications and Contracts."	"Graphic Statics."
	Perspective.
16 Meetings. Discussion Class.	Color Decoration.
8 Meetings. Painting and Sculpture and other Arts as allied to Architecture.	Water-color Class. (Saturday afternoons.)

INSTITUTE FINAL EXAMINATION.

These proposals are, however, not yet established facts. Their whole scheme is but in its infancy, and may never even be approved by the general body of members; but their move is a great step in the right direction, and, if it is carried out, I venture to believe it will be a great thing for English architecture. Of course, as will be seen from the curriculum, the report does not contemplate the absorption of the whole time of students. They are still supposed to be articled in an office, or semi-articled, and would take up the Association course in certain time allowed by their principals; or, if that course were not available, would work as best they could in the evening.

The London County Council to-day agreed, by a majority of about sixty, to undertake the duties of Model Lodging-house proprietors. Some time ago, soon after the Council was brought into existence, an inquiry was set on foot into the condition of the working-class population of London. A committee was appointed, with the result that they found that, although there was much to be done for the general working classes of the metropolis, the Model Lodging-houses were in a state of the most depraved character, insanitary as they well could be, scandalously managed, and, altogether, a disgrace to England. It transpired in the course of the committee's deliberations that the municipality of Glasgow had grappled with the question, and had erected, at a cost of £87,000, seven common lodging-houses — six for males and one for females. These have had a most excellent effect on the town, lowering the death-rates, necessitating the improvement of the existing common lodging-houses, and stimulating private enterprise. With this example before them, the Housing Committee determined to ask the Council to authorize an expenditure of £11,000 in the erection of a model common lodging-house for London, and, after a prolonged and adjourned discussion, their report was adopted by a considerable majority. Another point which the Committee is moving in is the question of the respective responsibility of the Vestries, or District Councils, and the central authority, or County Council, with respect to the demolition of insanitary areas in the metropolis. The removal of crowded insanitary alleys and courts is naturally an expensive and tedious operation, and is governed by two sets of Acts of Parliament, called, respectively, Torrens' Acts and Cross's Acts. The former of these deals with small groups of houses, and directs the District Boards to take action; the latter regards larger areas, and throws the *onus* of their reconstruction on the County Council. But, as a rule, the District Board looks on a condemned area as too large for it to undertake, while the County Council refuses to admit that the improvement is of general importance to the metropolis, and so decline to take action. So the absurd position arises that, while each body perfectly agrees that the condemned area is foul, overcrowded and dangerous to health, yet neither will touch it, for the reasons I have quoted. This question came prominently before the Housing of the Working Classes Committee of the House of Commons in 1885, and, as a result, an act was passed by Parliament, allowing the County Council to appeal to the Home Secretary to appoint an arbitrator to decide under whose jurisdiction the condemned areas actually came. The powers conferred by this act were, however, not taken advantage of by the old Metropolitan Board of Works, and it is only quite recently that the County Council have taken steps in the matter. They are now engaged in testing their powers under this act by certain test cases, and, if they are successful, there appears to be a probability of the great problem of outcast London being solved at last.

I regret much to have to announce the death of Mr. E. C. Lee, who died on the 29th of March. He was a man of real genius, whose loss will be a loss indeed to architecture. One of the younger school, an enthusiast and an ardent worker, his career was one of brilliant success, and it is a sad thing to have to record his death at so early an age. In 1869 he gained the Soane Medallion, and in 1870 the Pugin. He was one of the first promoters of the Architectural Association Sketch-Book, and was elected President of the Association in 1880, and would doubtless, if he had lived, have attained to the very first rank in his profession. We have also lost Mr. J. T. Wood, the great Ephesian explorer, and the discoverer of the site of the Artemision.

The designs for our "Watkin" Tower have been sent in, and include some fearful and horrible conceptions.

A Royal Commission, consisting of Mr. D. Plunket, First Commissioner of Works, Sir A. H. Layard, Sir Frederick Leighton, the Dean of Westminister, Mr. Louis J. Jennings and Mr. Alfred Waterhouse, has been appointed by the Queen — "(1) To inquire into the present state of the Abbey of Westminster as regards the facilities which it offers for providing for the interment, and otherwise preserving the memory of the most illustrious of our subjects, in the manner which has been customary for many centuries; and (2) to hear evidence and to consider plans for providing at the Abbey, or elsewhere, an additional place for memorials, should such a provision appear necessary."

An interesting paper was read the other night at the Institute by Mr. J. P. Seddon on "Church Furniture," and at the Association by Mr. Keith D. Young on "Hospitals."

THE STRIKE OF THE CARPENTERS.—PROFIT-SHARING. — THE INSTITUTE OF BUILDING ARTS AND THE ILLINOIS CHAPTER OF THE A. I. A. — THE ART INSTITUTE.

THE strike which during the last month has kept building operations at nearly a stand-still is now partially settled, the carpenters say with all their points gained. The method of gaining them has been by means of forming a new Builder's Association in which are found very few of the members of the old one, and this association has come to terms with the men. It was seen soon after the beginning of the strike that the former masters meant to remain firm and that nothing could be hoped from them. Hence the new association.

The eight hours is conceded; thirty-five cents an hour will be the minimum rate of wages till August 1st. After that date thirty-seven and one-half cents. Each employer can retain the apprentices he now has, and add one new one every year; the Union is recognized and consequently stewardship on a building enforced, with all the bad features which that implies. Over-time will be regarded as time and one-half, Sunday work as double. Contractors are prohibited from taking sub-contracts from the old association, and a joint arbitration committee will settle the rate of wages and adjust all difficulties at the beginning of every season.

So much for points gained for the men, of which the only weak part is this: The new association is chiefly composed of small contractors, unable from lack of funds to carry any large contracts, while the men who are able to do so are among the members of the old association. These consequently, the strike being over, will bring in non-union men from the country, and their work will go on cheerfully and serenely, unhampered by stewards or walking-delegates.

Thus the matter stands. The air has become less sapphire-colored, made so by anxious clients impatient to have their buildings brought to completion, the architect's days are no longer divided between interviews with irate clients and obdurate carpenters, and the new and the old association are chirping away at a pretty katy-did chorus of "She did" and "She did'nt," as to who gained the main points of the strike.

A noticeable feature of the struggle has been that almost without exception, the carpenters who took part in it have been neither American, English, or Scotch, but either Continental or of Continental extraction. The same reason that prevented the Anglo-Saxon

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carpenters from being dictated to and governed by the Union, has caused their compatriots, when Masters, to hold out longest and still continue to hold out against the league. About five thousand men were estimated to have gone out on the strike, and three thousand have returned to work. Considering the large number of men out of work, the strikers have been unusually orderly, but few cases of actual violence having been reported, though they did not hesitate to intimidate the men who did not join them.

In another branch of the wood-working trade there is now considerable excitement. The men, numbering some ten or twelve thousand, employed in the planing mills are agitating for less time and more pay, so there may be more trouble in the future.

But whatever is the inconvenience of strikes in general, there is no doubt that the condition of the working man has of late years been much improved by the organization that prompts them.

When a proposition, such as the Illinois Steel Company of Joliet last month submitted to its employees is heard of, one feels that the right of the laborer is being attended to. The plan is one of profit-sharing, and is to be conducted as follows. Employees can, on application, receive one per cent of their wages for the first year, one and one-half for the first year and a half and so on, with a half per cent increase for every six months, until in five years five per cent is reached. This per cent remains permanent, and interest being reckoned on wages received, the unskilled worker does not obtain as much as the skilled. The employers expect to gain in better work, less waste and continuous service.

Architectural circles here have had other causes for excitement this month outside of the strike. There has existed in our city an enterprise called the Institute of Building Arts. Its object was to offer the building public an opportunity to inspect material, inventions and all the latest improvements that would be likely to be needed in the construction of any kind of a building. Permanent rooms have been used for the exhibition, the expenses being defrayed by the rent paid for the space used by the exhibitors, five dollars a year for a square foot. This enterprise has been carried on by a private individual with more or less success for several years. This spring, wishing to retire from the business, he intimated to the Illinois Chapter of the American Institute that he would be willing to transfer the control and management of the enterprise to it.

Action upon this subject has given rise to much discussion, and the *pros* and *cons* of the matter have been warmly championed.

The arguments against adopting the Institute of Building Arts as a special child of the Illinois Chapter were as follows:

First, it was asserted that by so doing the Chapter, or its individual members, might become responsible for a large pecuniary amount. Secondly, an objection was raised that dissatisfied clients might consider architects were influenced in favor of certain articles placed in an exhibit in which their Chapter was pecuniarily interested.

To these arguments were given the answers, first, that the financial risk assumed could under no circumstances be a great one, and, with the successful inauguration and management of the proposed project, such satisfactory results might be obtained as to more than justify the trifling risk of a possible deficiency at the commencement. To the second objection the answer was given that, as no matter with what success the enterprise was crowned, no dividend would be paid to the members of the Chapter, a client most willing to find a cause for abuse and complaint could scarcely be able to in the relations existing between the architects as a body and the Building Arts. Should the association prove very successful, all surplus earnings would be devoted to enlarging the scope of the Institute. Skilled experts would be employed to make comparative tests of different building materials and appliances, and a course of lectures might be established upon subjects connected with their use, in this way making the Institute an establishment of use not only to the building interests of the city, but to the country at large.

That the feeling of the different members of the Chapter might be obtained, a committee of three was appointed to act in conjunction with the Executive Committee on this important subject.

The objection was raised that, as the charter obtained for the Chapter under the State laws was explicitly one for a society "whose object was not gain," there might be some objection to the scheme on the ground of illegality. Legal opinion was accordingly obtained, with the result that, as the enterprise was not for financial advancement of the individual members, no objection could be made to it on the ground of the nature of the charter.

The feeling of a very large majority of the members of the Chapter being in favor of taking the Institute under its management, it has accordingly been done, though some of the members are still violently opposed to it. The reorganization, under the management of two of our most prominent architects, is rapidly progressing, and most favorable results are anticipated.

The receptions at the Art Institute to the lover of art, who for years has had scant food here in Chicago, are a source of delight. At present, a most interesting collection is on the walls of its galleries. Two rooms are taken up with the works of Mr. F. A. Bridgman, which number about three hundred canvasses. It is most interesting to see here, by the side of his more finished works, the sketches which have often inspired them. His most ambitious picture is "The Pirate of Love," whose moral seems to have a setting like the morals in the dramas of Ibsen, and, consequently, to many is most unpleasant, whatever may be the artistic merit of the work. Mr. Bridgman, as a general thing, does not care to tell a story, and when he attempts it he is not always successful. He seems to agree with Fra Lippo Lippi:

> "If you get simple beauty and naught else,
> You get about the best thing God invents."

And such color as he finds in his beauty has never before been seen in smoky Chicago. Only to look at one of his walls, flecked with sunshine and shadow, or to gaze at a sparkling sea or some of his sunny fields, is to almost bask in Southern warmth and forget the constant northeast wind of our "Merry month of May," with its congealed sunshine and icy waves beating always along the shore.

Mr. Ellsworth has placed in one of the large galleries of the Institute for this exhibition his most attractive collection, containing, besides a most wonderful Rembrandt, much that is good of our young American artists.

Three bronzes of Barye's animals, a lion, a tiger and an elephant, find their place in the room, which is filled with Mr. Ellsworth's rare porcelain collection.

The Rembrandt in this collection is most unusual. It is the picture of a man with a pale face and clearly-cut features, all distinctly painted, nothing hidden, which makes one feel that the subject was so much a gentleman, the master could afford to let us see the whole head. Quite a contrast is he to the other Rembrandt of the collection, a red-faced old burgomaster, perhaps, peering out from wonderful shadows and shades.

These four galleries, with a fifth small one, which contains the other Rembrandt, a fine Breton, and Holman Hunt's wonderful "Triumph of the Innocents," make an exceptional exhibition.

PHILADELPHIA

THE ARCHITECTURAL EXHIBITION AT THE ART CLUB.

LACK of space in the letter of last month prevented a description of any but the students' drawings at the Art Club, so that, although the exhibition is now over, it may not be amiss to notice some of the other work in it. Mr. Charles T. Mott showed some six or seven of his straightforward drawings — all of them designs for different parts of a large house in West Virginia. Some of these have been reproduced in *Building*, if I am not mistaken, and are tolerably well-known, but it must have been a surprise to men familiar with the reproductions, to see the immense size of the originals. Mr. R. H. Robertson showed two of his heavily drawn houses with gables glistening with white plaster between the twisted black timbers. Messrs. Rossiter & Wright exhibited three drawings, two of them very skilful water-colors on gray paper, by Mr. Rossiter. One of these, a district school, has for its principal fault that it somewhat suggests a stable. Mr. Wright exhibited a pen-drawing of a good, simple, hipped-roof house with a tower. The house is of stone, but where the tower rises above the main roof its wall is shingled. In the drawing this upper part is left in light so as to give it about the value of the stone, while the roof is shown much darker. In reality the shingled wall of the tower would look quite as much like the roof as like the stone below it, and we should lose what is expressed so successfully in the drawing — the effect of a massive tower cutting unbroken through the eaves and rising solid and strong above the wooden roof.

Messrs. Longfellow, Alden & Harlow were represented by one of Mr. C. H. Walker's strong water-colors of the Carey Athletic Building for Harvard College, a simple design and thoroughly good, and by a dignified design for a bank building at Pittsburgh, in Mr. Langerfeldt's well-known rendering. Mr. James Brown Lord's designs are rendered, three of them by Mr. C. S. Luce and three by Mr. Hughson Hawley. Mr. Luce's are in his usual admirable style — broad washes, untouched, and leaving — except in rare cases — the paper with all its original brilliancy, and yet are not (except, perhaps, a charming colonial house in white and yellow) by any means up to the best work we have seen from his hand. The most attractive of Mr. Hawley's is a sketchy little water-color of an English-looking house at Tuxedo Park, in stone and half timber. The color on the roof, changing from salmon to purple, is particularly pretty, but it is hard to discriminate where all the drawings are examples of such perfect skill. Mr. Wilson Eyre, Jr., exhibited a couple of sketches in crayon — one of some houses near the Boboli Garden in Florence and the other of the campanile at Pistoja. Two more are very interesting studies for halls and staircases, and another, a long, low house in stone and half timber for Mr. A. J. Drexel, Jr. This drawing shows both elevation and plans — an example that it is possible architects would follow more generally if they appreciated how much interest the public took in studying out the plans and elevation of a house together.

Mr. Eyre also exhibited a charming pen-drawing of an imaginary castle that crowns a rock vaguely recalling the one on which the château of Amboise rests, and a fascinating study of a house on the brow of a hill, after the manner of Mr. Howard's sketch in the

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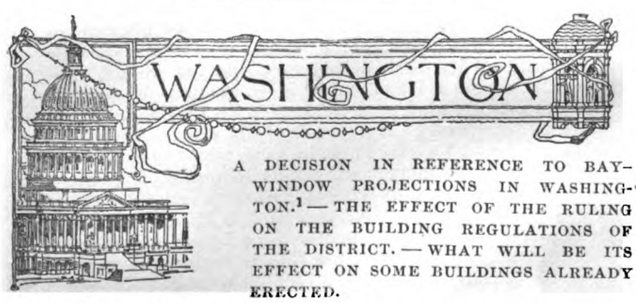
Architectural League's Exhibition, called "An Upland Farm." Mr. Eyre's other sketches are all interesting — even a somewhat messy competitive design for the Penn Mutual Insurance Company — for they are all the work of an artist.

Mr. T. P. Chandler's design for this same building, already exhibited at the Academy, was again shown here with a few of his earlier designs, rendered by himself, and one done from a photograph by Joseph Pennell, with a wealth of spiky grass and luxuriant apple trees in the foreground. Messrs. Cope & Stewardson had nothing but their competitive design for the Cathedral of St. John, already exhibited at the Academy. Messrs. George C. Mason & Son exhibited a villa at Newport, large, but with little repose, and one of Mr. D. A. Gregg's direct, clean water-colors of a gate-house. Messrs. Moses & King had a rather interesting country-house, Mr. Windrim a design for a hotel somewhat of the "Lafayette" type, and Messrs. Wilson Bros. & Company six drawings, among which the perspective of the Drexel Institute Building was, by far, the most important. This impressive building, work on which is already begun, will cost about half a million dollars, and Mr. A. J. Drexel, whose gift it is, will give a million more as an endowment fund. There will be room for more than than two thousand pupils, both boys and girls, and they will follow courses of instruction somewhat like those of the Cooper Institute in New York. The building will cover a lot about two hundred feet square, and will be built around a central glass-roofed court nearly a hundred feet across. Galleries at the second and third floor levels will give access to the school-rooms. The building will have, besides the necessary school-rooms, gymnasium, etc., two lecture-rooms, the largest of which, with a seating capacity of two thousand, can be reduced in size by a huge curtain as high and as wide as the room itself. The curtain is hung from tracks in the ceiling, and may be pushed back and forth at will. The perspective shows us a very imposing building, in buff, brick and terra-cotta, three stories high, except the central pavilion, which rises a story higher above the entrance arch.

Messrs. Sturgis & Cabot exhibited two designs for St. John's Cathedral already shown in the League Exhibition in New York, a beautiful water-color, quiet and in one key, of a long, low country-house, a very knowing water-color drawing of a stable seen between the trunks of young forest trees, and a perspective of the Willard School at Quincy, Mass., which shows an E-shaped plan and a thoroughly good one for the purpose.

Some of Mr. H. P. Kirby's drawings were here that were not in his general exhibition at the Academy, and they were among his best. The railway station is one of the most striking drawings Mr. Kirby has ever made, but would probably be not very practical in execution. Its skyline is particularly effective, and the richness of the decorated parts of the building is enormously increased by the contrast of its immense wall-spaces and its solid Gothic towers unprofaned by any window, but the spectator inevitably wonders how the light is expected to penetrate the fastnesses within. Two of the drawings from photographs are very disappointing — not on account of the drawing itself, which is, of course, irreproachable, but because it seems as though where Mr. Kirby confines himself to copying strictly the lines laid down for him, he loses the freedom that gives such an irresistible charm to his vigorous fancies. Mr. Jacques Van Straaten exhibited some very attractive sketches from Holland and Italy, Mr. George Nattress a few of his water-colors of English churches, Mr. E. A. Gifford seven or eight charming pencil-sketches, and Mr. W. E. Chamberlin a clever sketch in pastel and Chinese white of the little-known Château d'O, and a most excellent water-color sketch of a tower at Mortagne.

There were besides these few mentioned, several times as many deserving remark, as well in sketches from Nature as original designs. In thinking over the general impression produced by the latter class, one cannot help making the reflection that American architecture would take a much higher rank in the world if some of the time devoted to finishing the drawings and rendering them with evidences of such mastery of technique, were devoted to studying and restudying the first designs in a more scholarly way.

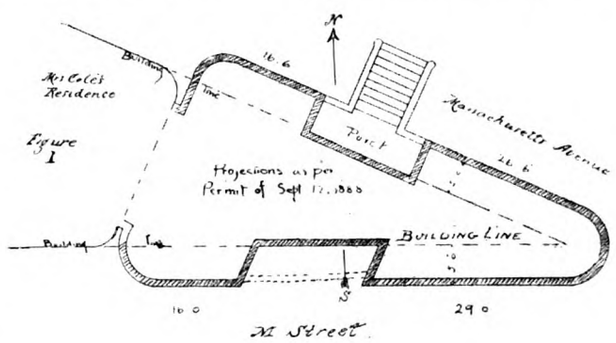


A DECISION IN REFERENCE TO BAY-WINDOW PROJECTIONS IN WASHINGTON.[1] — THE EFFECT OF THE RULING ON THE BUILDING REGULATIONS OF THE DISTRICT. — WHAT WILL BE ITS EFFECT ON SOME BUILDINGS ALREADY ERECTED.

THE United States Government owns the parking in front of all the residences in Washington. This ground is practically allotted to each house as a front-yard, thus enhancing the beauty of the city by a continuous line of grass, flowers, or shrubbery. The owners can fence, curb, or leave it entirely open. In fact, the United States Government has been very liberal with this ground. The only limitation put upon its use and occupation is in the width and projection of such permanent structures as bay-windows, towers and steps which are allowed to be erected thereon by law.

The natural tendency (especially when the lot of the property-owner is small) is to occupy just as much of Government ground as he can stretch the building regulations to grant, the building inspector, the commissioner in charge, or the commissioners acting as a board, to concede.

The Cole case is probably the extreme, both in the amount asked for and in the amount granted by the permit of the inspector, and



endorsed by the commissioners. Figure 1 will show for what Mrs. Cole received a permit.

The building regulations governing the point, say, "Bay-window and tower projections five feet on parked streets . . . shall not exceed fourteen feet in width *unless approved by the Engineer Commissioner*. But one projection will be allowed on buildings thirty-five feet or less in width. On larger fronts the projections shall not aggregate more than fifty per centum of a frontage of a principal or entrance front, and forty per centum of a side front, exclusive of corner tower projections."

If the house was to be erected as an independent one, Mrs. Cole had about fifty-two feet front on Massachusetts Avenue and fifty-five on M Street, hence she would have been entitled to two thirteen feet windows on Massachusetts Avenue and two eleven feet windows on M Street. The new house was designed so that it could be used in connection with or separate from the adjoining house. The permit was issued on the basis of its being an addition to the old house which had a projection only at the front-door. This point being allowed she was entitled to as much or more than was granted by the permit, provided that the Engineer Commissioner in his discretion would concede a wider projection than fourteen feet.

These points all having been decided in her favor, Mrs. Cole's case should have progressed smoothly, but her trials seem only to have commenced at this point.

The neighbors objected to so much of their view being cut off, and by some legal process brought action in court to have the obstruction removed. It was defended by Mrs. Cole, and by the District Commissioners through the District Attorney.

The complaints caused the commissioners in board assembled to request Mrs. Cole to give them the permit back. She did as requested, and then they declined reissue, or to permit her to go on, although the house at this time was well advanced in its construction. The house stood in this condition for many months, when new commissioners coming into power, she was granted a permit to finish the house according to the dotted lines shown on plan, and build over the porch in the second and third stories. The new commissioners were apparently more liberal than the first, but as they were there to make, alter or interpret the law, any one would feel safe in building under their instructions. In fact, there is little safety in erecting projections if their authority is not final.

The Supreme Court of the District of Columbia in General Term decided against Mrs. Cole. The decision seems to have several points in it which are of great importance to property-owners, or those contemplating building in this city.

The judges concede the power in the commissioners to make regulations as to projections on the parking; but affirm that they have *no* power to delegate *discretionary power* to any one. So the Engineer Commissioner exceeded his authority when he granted more than fourteen feet in one projection. The commissioners themselves had no right, according to the judges' ruling, to allow more than fourteen feet, without changing the building regulations and making such change a general rule.

The second novel point was that the "two projecting walls (of a bay-window or tower) must start from the building-line from which the structure projects." In other words, there can be no projections around a corner. "We simply hold that all projections must be from a building-line, this apex cannot be treated as if it were a third building-line."

The first ruling would bar out all clauses in the regulations allowing discretionary power to the Building Inspector, as well as to one of the commissioners who had been vested with authority by these regulations.

Such clauses as "to be determined by the . . ." "as may be directed" . . . "shall be determined by" . . . "and the permission

[1] The United States *vs.* Annie Cole *et al.*, Equity No. 11,451.

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of the " . . . " to be approved by the " . . . " unless otherwise determined by " . . . " in such manner as the Building Inspector may direct."

" Under such restrictions as the Building Inspector may impose with the approval of the Commissioners."

All such clauses, and the building regulations are full of them, are unlawful according to this decision. The commissioners have no power to delegate discretionary authority to either themselves or any one else. They must make a general rule, and all questions must be decided by this general rule until another rule is formulated and published as a general rule or regulation.

This narrows the present regulations down to such an extent that they should be thoroughly revised, so as to protect the community against poor and bad building. As the numerous discretionary clauses allowed of wide variations in the ruling by the commissioners and the inspector, it will be better to have what is necessary formulated and adhered to. Then architects and owners will know better what they can depend upon. Now what is allowed in one week or one day, may be altered the next week or day. So that it is often necessary for an architect to alter a set of plans so as to conform to the new ruling, when two days before he had a set passed with similar points incorporated in them.

The second point will, if enforced, have an equally wide effect on new buildings.

A projection where the two projecting lines must start from the building line from which the structure projects, will stop all corner

Fig. 2. Forms of corner projections made necessary by the new ruling.

projections, that extend around the point without touching it. The nearest approach to a corner-tower projection would be according to

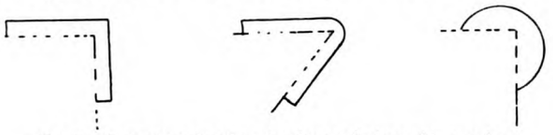

Fig. 3. Forms formally allowed and extensively used in practice.

Figure 2. In no case could the usual corner projection, (Figure 3) be allowed, where the projecting line returned to another street.

The above has to do with future building.

The following portion of the decision is of great importance in its bearing on houses already built, and will be a great hardship on hundreds, thousands would probably be no exaggeration, if I understand the judges' wording.

The court can and will require all work to be taken down or abated, no matter what its value, it makes no difference whether authorized by the Building Inspector, District Commissioners or not.

Along with Mrs. Cole's house, this ruling in reference to width will affect among prominent buildings, the Church of the Covenant Tower, the Safe Deposit Building on 15th Street, and numerous residences and stores throughout the city. The residence of the judge reading the decision being one of the number.

The ruling in reference to projections extending around a corner, will affect residences, stores, and churches in all parts of the city. Curious to say, the Inspector is still issuing permits for corner projections when the ruling of the Supreme Court of the District is law, unless reversed by the Supreme Court of the United States, where I understand, the matter has or will be finally appealed.

If the final decision of the United States Supreme Court is against such infringing projections, and their abatement should be insisted upon, there will be few squares in the city but will have one or more dismantled bay windows or towers to be reconstructed. This would apparently be a hardship when the offending parties had proper permission from the only visible authority, and this authority was appointed by and were acting as the agents of the United States Government, the owner of the streets.

TO BUILD UPON THE SANDS SECURELY. — A process of preparing foundations has been patented by F. Neukirch, of Bremen. Its object is to make loose sand firm and resisting as solid rock. At present the universal method of doing this work, if under water, is to remove all loose material and then make a beton or other similar substructure. The process under consideration, which is only of use where the materials are fairly clean siliceous or calcareous sand, aims at consolidating the grains by covering them with a film of cement, which is forced into the spaces between the particles by compressed air, steam, or water under pressure. Sheet piles are employed to prevent the spreading of the cement over more ground than is necessary. The system has been largely used in the harbor of Bremen, and is to be tried in preparing dry foundations. — *Builder's Reporter.*

ITS PRIMITIVE ARCHITECTURE. — GEOGRAPHICAL SITUATION. — ITS FOUNDATION. — FRENCH RÉGIME. — SPANISH DOMINATION. — RETROCESSION OF LOUISIANA TO FRANCE. — ACCESSION TO THE UNITED STATES. — JACKSON'S TRIUMPH.

THERE is no better place in the Union for the study of primitive American architecture than the "Crescent City." It was here that the direct influence of southern Europe was brought to bear, under circumstances so different from those to which it had been accustomed in its native element, that it produced types, which, though coming under the general classification of what has been termed the colonial style of America, bear a stamp of individuality about them, that shows the impression produced by the rule of despotic sovereigns upon docile and subservient subjects.

To understand the successive types and their modifications from time to time, it is necessary to know something of the geographical surroundings, as well as of the interesting points of history, connected with this typical southern city. And for that reason, this letter is devoted to a review of the historical and geographical data, which contributed to the growth and moulding of a city, more foreign to-day in its aspect than any other within the borders of this Republic.

New Orleans is located at a spot on the left bank of the Mississippi nearly one hundred and five miles from the Gulf; and at the point where the river approaches nearest to Lake Pontchartrain. The inhabited portion of the city extends as far north from the river bank as the rising ground (Metairie Ridge) formed in prehistoric times by the meeting of the waters from lake and river. The tract of land extending from the lake to the ridge, though mapped out in streets and avenues, has never yet been drained and utilized, remaining to-day a swampy marsh or lowland unavailable for occupation. The development of the city at present is confined principally along the river front on account of the commercial interests of the citizens.

Commerce is well provided for with a stretch of river bank of fifteen miles on the left shore and five miles on the opposite side, against which the deepest draught ocean steamers that come to this port are moored. Besides this, there is access to the coasts of the Gulf States through Lake Pontchartrain, and by this channel most of the building material in use in the city is brought, indeed there is very little received in any other way.

That portion of Louisiana from the mouth of Red River down, is the result of centuries of sedimental depositing of matter carried down by the river, so that New Orleans is built upon land formed in this way, and therefore cannot boast of a natural rock foundation. Thus, on account of total absence of native building stone, it is easy to understand why we do not find it employed in early architecture. The comparatively small quantity of stone that found its way thither was invariably used for paving purposes.

Although the discovery of the Mississippi River belongs to the Spaniards, Louisiana was taken possession of by La Salle in the name of Louis XIV. In his expedition from Lake Ontario, with a small band of Frenchmen, he descended the river to a point near the head of the "passes," and there erected a cross and a column which bore the arms and name of Louis and the date. Calling a notary to witness, he took possession, naming the territory after the king. A salute was then fired by the company of French, and they shouted "Vive le Roy!" After which they buried at the foot of a tree a leaden plate engraved with the arms of France and the inscription in Latin:

"In the reign of Louis the Great
9th of April, 1682,
Robert Cavalier [de la Salle], with Seigneur de Tonti, Reverend Father Zenobio, member of the Recollect order, and twenty Frenchmen first navigated this river from the village of the Illinois, and made the passage of the mouth
9th of April, 1682."

On the 6th of September, 1717, a charter for the colony was given to the "company of the Indies" on the condition of furnishing to every king of France at his accession, a gold crown of thirty marks in weight.

Sailing along the shores of Lake Pontchartrain, (named after Count Pontchartrain, then Minister of Marine of France) Bienville in 1718, on his way with the colonists from the original settlement at Biloxi, which had proved a failure, discovered Bayou St. John, and, ascending it, encamped for the night on Metairie Ridge. Bienville immediately perceived the excellence of the site for a city of

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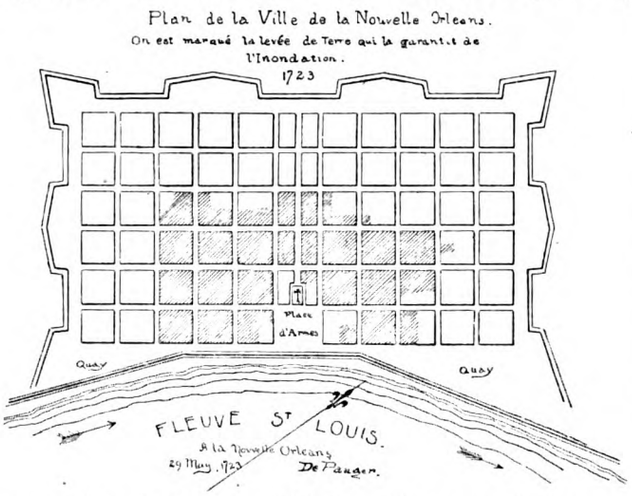
importance, and, clearing the space of its primitive forest of magnolia, live oak, and cypress, he built a dyke or "Levee" (pronounced Lev'-y) to prevent the Mississippi River from flooding the settlement, and established there the colony, naming it after his birthplace, and, at the same time, after the Regent of France — Nouvelle Orléans. The city was laid off systematically in 1719, by De la Tour, chief engineer of the Province; and five years later a survey and map



were made by De Pauger, and it is from this map, now in the possession of the Louisiana Historical Association, that we get the following sketch and information. At that time the city consisted of sixty-six squares, each three hundred feet. The frontage on the river was eleven squares, the centre one occupied by the "Place d'Armes" where the provincial troops were drilled in military exercises. In the centre stood the mast from which floated the flags of three nations at different periods of the colony's existence. Facing the centre of the Place d'Armes was the spot chosen for the cathedral, and from the rear of the cathedral a street was laid out called after the Duke of Orleans. All the streets were narrow after the custom in tropical climates to secure shade; and they were named in honor of the Royal family of France. The principal street was called Rue Royale; and of the others we have Bourbon, after the dynasty; Dauphine, from the Dauphiness of France; Chartres, after the eldest of the Orleans princes; Conti, from the Princes of Conti; Dumaine and Toulouse, after the illegitimate sons of Louis XIV and Madame de Montespan, the Duke du Maine and the Count de Toulouse; St. Anne, St. Pierre, and St. Paul Streets, after the baptismal names of princes of the House of Orleans; St. Louis street was called from the patron saint of France, a name, which, at that time, was conferred on the Mississippi River.

In 1762, the colonists were disgusted to hear that Louisiana had been given to Spain by Louis XV in recognition of service during the French and Indian War, and their determined resistance daunted the Spanish Governor to such an extent that he returned to Spain without taking possession. This infuriated Charles III, and he sent General Alexander O'Reilly with a fleet of twenty-four men-of-war containing an army of 2,600 men to take the colony by force. All resistance ended, when, on the 17th of August, 1769, the twenty-four ships appeared before the city; and the inhabitants, in accordance with the French Governor's proclamation, were on hand at the "August ceremony, to present themselves to His Excellency Don Alexandro O'Reilly, in order to assure him of their entire submission, and of their inviolate fidelity to his Catholic Majesty." On the following day, amid the most imposing ceremonies, O'Reilly landed, followed by the new Spanish officials; and, after having saluted the French standard, it was replaced by the Spanish flag, and the keys of the city-gates were turned over to the new authorities. These manifestations all took place in the Place d'Armes, in front of the Cathedral, and surrounded with both French and Spanish troops. The "Spanish Domination" was exceedingly severe in policy, opening with the bloody punishment of the leaders, who had, in 1762, excited the people to oppose their new masters. The city, during this period, was strongly fortified, as much for the purpose of keeping the inhabitants in subjection as for defence. The streets — Esplanade, Rampart and Canal — in their names suggest the location of these works, of which no trace has been left, having been levelled by advancing civilization. On the 1st of October, 1800, the territory was returned to France, and although the treaty was for some years kept a secret, on account of wars with England, the French took possession.

During the latter years of the Spanish *régime*, the limits set by the ramparts were found insufficient for the growing city, so, during that epoch and the one following, suburbs were built beyond the walls, but still clinging to the Missippippi banks. The suburb, or *faubourg*, below the city belonged to Baron de Marigny-Mandeville, and the naming of the streets is unique. Thus we have Good-children, Wise-men, Independence, Love, Poet and Piety Streets. In the *faubourgs* above the city we find the streets laid out after the retrocession to France, and at the time when Napoleon was in the height of his glory, so we can account for Napoleon Avenue and Josephine Street. His generals and victories are recognized in Cambronne, Austerlitz and Jena. Farther than this, it is possible to detect that love for the study of the classics in which the world indulged at about this time, and in which Napoleon himself took so much delight, for we have streets bearing the names of the Muses, of Apollo, of Dryades and of Naiads of mythology.

Bonaparte feared that the English would seize Louisiana, and so signed the treaty which ceded it to the United States for $15,000,000, remarking, as he did so: "This accession of territory strengthens forever the power of the United States, and I have just given to England a maritime rival that will, sooner or later, humble her pride." In December, 1803, the transfer was made, and from that time the work of enlarging and beautifying the city has occupied the minds of the citizens.

In 1815, Andrew Jackson, the hero of the plains of Chalmette, was afforded a triumph upon entering the city after his victory. Children scattered flowers in his path, and, as he passed under the triumphal arch in the centre of the Place d'Armes, erected where now stands his equestrian statue, he was crowned with laurel. The Place d'Armes has from that day to this been called Jackson Square, and is still the centre of all that is attractive and interesting in the Creole quarter of New Orleans.

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

ALLEGHENY COUNTY COURT-HOUSE AND JAIL, PITTSBURGH, PA. H. H. RICHARDSON, ARCHITECT.

[Gelatine Print issued only with the International and Imperial Editions.]

HOTEL AT BIG STONE GAP, WISE CO., VA. MESSRS. WINSLOW & WETHERELL, ARCHITECTS, BOSTON, MASS.

SKETCHES BY A ROTCH TRAVELLING-SCHOLAR. MR. E. A. JOSSELYN.

TOWER OF THE MEMORIAL CHURCH OF THE ANGELS, LOS ANGELES, CAL. MR. E. A. COXHEAD, ARCHITECT, LOS ANGELES, CAL.

A PERSPECTIVE drawing of this church was published in the *American Architect* of January 11th last.

THE RADFORD HOTEL, RADFORD, VA. MESSRS. COPE & STEWARDSON, ARCHITECTS, PHILADELPHIA, PA.

[Additional Illustrations in the International Edition.]

HOUSE OF THERON G. STRONG, ESQ., BAY SHORE, L. I., N. Y. MESSRS. ROMEYN & STEVER, ARCHITECTS, NEW YORK, N. Y.

[Copper-plate Etching.]

THE interior of this house is finished in white pine (painted), including the staircase which has a mahogany hand-rail. It is of colonial design throughout and cost $18,000. See plans on next page.

HOUSE IN THE WALLFISCHGASSE, VIENNA, GERMANY. HERR LUDWIG TISCHLER, ARCHITECT.

[Gelatine Print.]

CARR MANOR, LEEDS, ENG.: SOUTH FRONT. MR. EDWARD S. PRIOR, M. A., ARCHITECT.

CARR MANOR, LEEDS, ENG.: THE HALL. MR. EDWARD S. PRIOR, M. A., ARCHITECT.

CARR MANOR, LEEDS, ENG.: THE DRAWING-ROOM. MR. EDWARD S. PRIOR, M. A., ARCHITECT.

CARR MANOR, LEEDS, ENG.: THE DINING-ROOM. MR. EDWARD S. PRIOR, M. A., ARCHITECT.

NEW BANK, LANDPORT, PORTSMOUTH, ENG. MR. J. HENRY BALL, A. R. I. B. A., ARCHITECT, SOUTHSEA, ENG.

THIS bank is now in course of erection for Messrs. Grant & Maddison's Union Banking Company, of Portsmouth and Southampton. It will be in close proximity to the Portsmouth new Town-hall, and will form an important addition to this much-improved commercial centre. The whole of the building is to be faced with Portland stone on a gray Cornish granite plinth, and comprises the necessary offices for the business of the bank, a dwelling-house for the manager, and, in addition, a shop and show-room over. Great care has been taken to overcome as far as possible the difficulties of the site. The contractor is Mr. William Ward of Fratton, and the amount of the contract is 3,598*l*.

COTTAGE HOSPITAL, SIDCUP, KENT, ENG. MR. H. P. BURKE DOWNING, A. R. I. B. A., and MR. W. R. PHILLIPS, ARCHITECTS.

THE accommodation provided is for nine patients, besides operating-room, dispensing-room, nurses'-room and all the necessary

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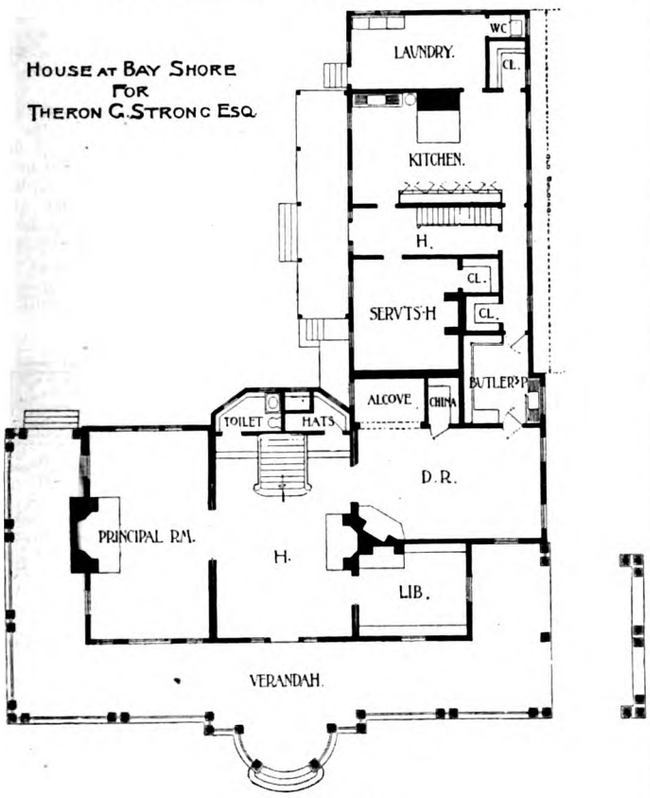
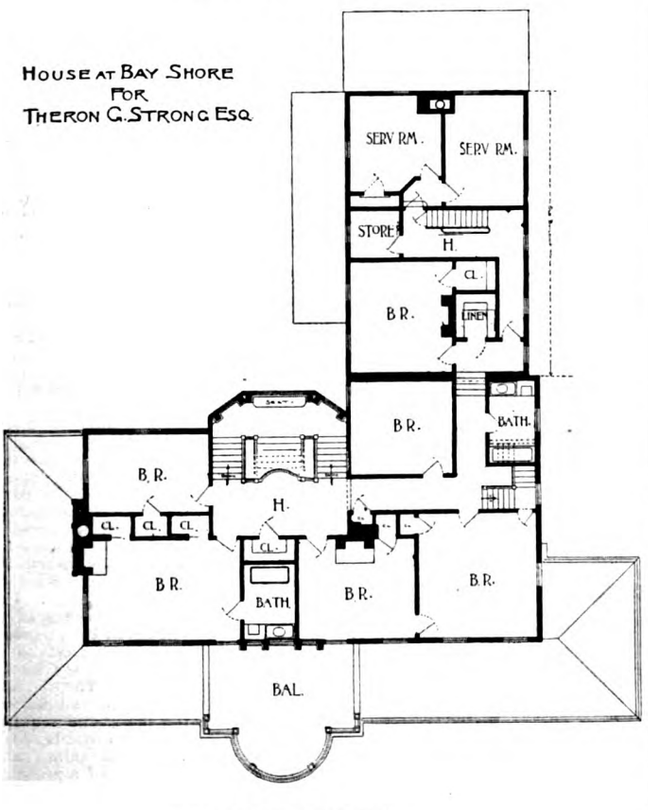
offices. A large convalescent-ward, opening on to the balcony, occupies the first floor. The sanitary arrangements are of the most approved kind, and the ventilation is obtained in the simplest and most effective way, depending chiefly on purely natural means. Economy had to be studied, and opportunity afforded for subsequent additions, if found necessary. The materials intended to be used are red brick and Ancaster stone, and roofing of Broseley tiles. The estimated cost amounts to 1,490*l.*



PLAN OF FIRST FLOOR.



PLAN OF SECOND FLOOR.

We omitted to state, last week, in publishing the print of Mr. Gibson's Albany Cathedral Pulpit, that we did so through the courtesy of the Soule Photograph Co., the owners of the negative.

BUILDING LAW.

BIRMINGHAM, ALA., May 4, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs,— As administrator of the late architect, Ed. Sidel, I have two cases on hand, in which I believe you can give me some information and refer me to decisions of courts to which my attorneys can refer and bring them to bear upon the court, here. The cases are very similar.

One is where he undertook the erection of a residence to cost something like $25,000; but which in fact cost about $34,000. The owner was aware before signing any contracts that the amount would exceed the first estimate but contracted for this amount and made some changes which caused additional cost, and now he refuses to pay more than the per cent on the original estimate. We claim the full per cent upon the total cost of the building; he having accepted same. Are there any decisions of the Supreme Court or any other court that you know of sustaining the Institute in this claim as well as us, and which would be of any service to me?

The other case is where Mr. Sidel made an estimate upon an office-building to cost $170,000, and which cost about $250,000. In this case, during his absence from the city, the contractors for the concrete foundation put in work, which afterward proved to be useless and had to be taken out and replaced. He has forfeited any claim to a per cent on this work, but claims his per cent upon the full cost of the superstructure above the foundation. The owners are only willing to pay upon the estimated cost, $170,000.

Trusting you will pardon me for thus intruding upon your time, but knowing you are ever ready to advance the cause of the profession, and hoping to receive an early reply I am,

Yours very respectfully, J. W. GINDER.

[OUR advice would be to settle both cases amicably with the parties, or, if that should not be possible, to agree with them upon referees, to decide the matter. Undoubtedly, the architect is entitled to his percentage on the total cost, and, if this is, through no fault of his, but by the wish and request of the owner, greater than the early estimates, which probably applied to something quite different from the structure actually executed, the discrepancy cannot be used to reduce his compensation. There are cases involving this point, among others: but in all such controversies, there are so many circumstances for the jury to consider that precedents are of very little use. In the present instance, any fair-minded owner or referee would see that the architect's duties were increased by the additions made to the cost of the building, and that he ought to be paid accordingly, and, if the owner thought he had been really misled, to his injury, by the architect's original estimate, the architect ought to be willing to take that into consideration, and accept with a good grace a little lesson to be more careful next time. If the matter comes into court, it is certain that every sort of counterclaim that the imagination of the opposing counsel can suggest will be set up against the architect, and, although the charges may, one by one, be disproved, the process is a very long and costly one, and the architect who undertakes it single-handed must make up his mind to a struggle in which, at the best, victory is little less expensive than defeat. His opponent, however, usually suffers quite as much as himself, and it is much cheaper for both parties to make concessions, and settle the controversy for themselves, than to pay out hundreds, or, more probably, thousands of dollars in hiring lawyers to aggravate and prolong it at their expense. — EDS. AMERICAN ARCHITECT.]

COMMUNICATIONS.

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

COMPUTING THE CURVE OF AN OGEE DOME.

May 13, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — Can any of your readers give us a rule for computing the foreshortening of curve for an ogee dome, say one measuring 12:0′ at the base, the curve starting at about 40:0′ from the ground. DRAUGHTSMAN.

[To "compute" such a curve would be a long mathematical operation. To construct it, all that is necessary would be to take points in it, plot them in plan and elevation, put them in perspective, with the given vanishing points, and draw a line through the points. — EDS. AMERICAN ARCHITECT.]

NOTES & CLIPPINGS.

AFTER SIX HUNDRED YEARS OF BURIAL. — The Rev. Father John Morris, a Fellow of the Society of Antiquaries, sends the following letter to the London *Times*: "A few days ago I saw a sight in Canterbury Cathedral that interested me greatly, and as I am not aware that any account of it has been sent to you, perhaps you will allow me very briefly to describe it. In the course of the investigation into the history of the cathedral that the Dean and Chapter have intrusted to a committee of experts, a local tradition has been swept away, or indeed, I might say two incompatible traditions. In the south wall of the aisle of the famous Trinity Chapel at the east end of the cathedral stands a tomb, which for some long time past has been called by Archbishop

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Theobald's name. He was the predecessor of St. Thomas of Canterbury in the Metropolitan see, and the year of his death was 1160. Those who are conversant with the history of the cathedral will have always known that Theobald was buried elsewhere. Inconsistent with this tradition was another to the effect that when the choir of the cathedral was burned in 1174, the shrines containing relics were flung down from the beams on which they rested, and the relics from the broken shrines were collected by the monks and placed in this tomb. It must be acknowledged that the tomb presents much of the appearance of a shrine; and as it has projecting from the quatrefoils of its ridged roof various marble heads in deep relief, it was not surprising that these heads should be regarded as those of the saints whose relics were supposed to be within. That ridged roof has been lifted off, and it has been ascertained that no relics from the broken shrines were deposited there. But underneath there is a coffin-lid, which also was raised, and there beneath lie the undisturbed remains of an ancient Archbishop, fully vested. The body has been left as it was. The objects of value that were in the coffin have been carefully removed; and this, indeed, was a necessary precaution, for it would not have been wise to leave them there now that they are known to exist. These will form part of the treasures in the Chapter Library: a beautiful chalice and paten, silver parcel gilt; a gold ring with an engraved emerald; the pastoral staff of cedar wood, with a very poor volute, but with three engraved gems in the knob; and some specimens of beautiful embroidery on the vestments. These will all be precious helps in the history of mediæval art. And who is the Archbishop upon whom we have reverently gazed? It is either Hubert Walter, who died in 1205, or Cardinal Stephen Langton, whose death was twenty-three years later. I do not now trouble you with the reasons that lead me to believe that the face I have seen is that of the great Archbishop who sided with the barons of England against King John in the struggle that gave us Magna Charta. I am not exaggerating when I say that I have seen the face of an Archbishop who lived six centuries and a half ago. The state of preservation of everything in that stone coffin was very wonderful. The vestments were quite sound — all but the woolen *pallium*, which had almost perished, though its pins were there — and to my great surprise, the shape of the nose and chin was clear and distinct. 'May he rest in peace,' I may be permitted to say, in a sense different from that in which usually those words are said. These remains have been treated with the greatest respect, and the Archbishop rests still quite undisturbed in the stone coffin in which he has rested so long. To have seen, not a heap of bones — for I have seen none but those of the head and hands — but to have seen Stephen Langton in his vestments, is an event in life, and I am very thankful to those who have done me the signal service of inviting me to Canterbury at such a time." — *N. Y. Evening Post.*

Extent of the Roman Catacombs. — The most perfect map of any portion of the catacombs that has yet been published is that which was executed under the immediate superintendence of Padre Marchi. It contains the eighth part of the catacombs of St. Agnes, and the greatest length of the portion thus accurately mapped is about 220 mètres or 240 English yards, and its greatest width about 170 mètres, or 185 yards. This, multiplied by 8, would give us somewhat less than 9 English furlongs for the greatest length of the whole catacomb, and nearly 7 for its greatest width — that is, supposing it to extend equally in all directions; and as the catacombs of St. Agnes appear to be of average dimensions, being larger than some and less than others, any one who is fond of arithmetic may amuse himself with a further multiplication by 60, in order to learn something of the probable extent of all the catacombs taken together. But, in truth this method of calculation will not bring us to any safe and satisfactory conclusion, were it only for this reason, that the excavations of a catacomb are by no means equally distributed throughout its several parts; for instance, if I were to take my sample from some portions of the map before me, I might say that the thickness of the rock left untouched between the several roads or streets, ranged from 2 or 3 to 12 or 13 feet, whereas if I took a sample from other portions of the same map, I should say that it varied from 26 to 40 or even to 70 feet; so that it is obvious that the knowledge of the extreme limits of a catacomb, even if it could be ascertained, would give us no criterion whatever of the number of its streets and walls, nor consequently of its graves. Looking, however, at the same map in a different point of view, not at the mere length or breadth of the space described, but at the actual number and length of the streets which it contains, it seems to supply the basis of a sober and reasonable calculation, in which we cannot be deceived. Measuring them roughly, I should say that they extend at least 3 kilomètres, or something short of 2 English miles; multiply this by 8, and we have 24 kilomètres, or 15 miles of subterranean streets in the catacomb of St. Agnes alone, and 1,440 kilomètres, or not less than 900 miles in all the catacombs taken together. When I had made this calculation it was with no ordinary satisfaction that I observed how nearly it approximated to one made by Padre Marchi upon principles altogether distinct, and which might have been objected to as based upon conjecture rather than upon well-ascertained facts. He conjectures that there may have been twenty confraternities of fossores, or diggers, and that these might have excavated about 70 feet of road, and a hundred graves every day; and this, taking two complete centuries as the time during which the catacombs continued to be used as Christian cemeteries, gives a total of 1,200 kilomètres, or 720 miles altogether, and six million graves — an amount which, however startling to persons unfamiliar with the subject, Padre Marchi cons ders much too small, both from his own experience of the actual extent of the catacombs and from long and careful studies as to the probable number of Christians to be found in Rome in those days. — *The Architect.*

Ancient Athens. — Indeed, all Athens is the grave of objects that we would fain have seen. In the market-place was the stone where the grandson of Aristides the Just used to sit. Justice had not profited him, and he made his livelihood by interpreting dreams out of a little book of fate. The stalls of the potters and fishmongers and barbers were all around. Here the mean man slunk home, carrying the fish he had bargained for; the superstitious man anointed with oil the sacred stones; the shameless man ran away from the butcher's stall with a piece of tripe; the fops loitered and gossiped in the shops of the perfumers; while over the city wall the satirist fished with baits of gold for philosphers, like the Red Fisherman of Praed's poem. They are all gone and gone with them the temples, with the rough wooden idols in the holy of holies, or with the shining shape of Athene dimly seen in the shimmer of gold and ivory and precious stones, with all her treasures around her. What would not the antiquarian give to see all that Pausanias saw — the pictures, the woven raiment, the statues, the ancient wooden Hermes, offered by Cecrops, the serpent king, and the Persian spoil, the breastplate of Masistius, the dagger of Mardonius? These are lost, yet, in the change of things, we can look on what Pausanias never dreamed of beholding — the sword blades of Agamemnon, etched with pictures in divers colored gold, and all the spoils of Troy, buried in his grave at rich Mycenæ. Time, that took away so much, has restored a little, and is daily giving back more, but of the gold most has been worn in circulation. Of the ivory who knows but that some examples may yet be found scattered in graves of the North, treasures of the wandering Norsemen and Teutons, who laid hands on this, as on all the loot of the old world? But time can never bring back the forgotten wealth of Athens, which Pausanias saw in a lull of the wars of the world, in a windless age between the defeat of one creed and the victory of another. — *London News.*

TRADE SURVEYS

The increase of nearly $15,000,000 in the gross earnings of 149 railroads during the first quarter of this year, as compared to the first quarter of last, is a very favorable showing. The net increase in earnings amounted to over $5,500,000. That this increase will continue for several weeks to come seems to be very generally anticipated, and there are good grounds for the anticipation. Consumers in every department have for some months past been buying no more material than they could immediately work up; the manufacturing interests have generally pursued the same careful policy, and, as a result, the jobbing and manufacturing centres of the country are not overloaded with stocks, though there are notable exceptions in one or two branches of trade. Two opposing theories are held by the business interests: one is, that the country is on the eve of a boom which will carry prices upward, possibly, and even probably, to dangerous limits; the other is, that prices have reached a point at which they are likely to remain; that producing-capacity, taking all the industries into account, will not be greatly increased, and that business will be good throughout the year. The salient features of the financial, commercial and manufacturing situations can be very easily presented, but it is when it comes to forming opinions based upon these conditions that mistakes are liable to be made. The country is to-day producing more than at any previous time; there is more furnace, foundry, iron-mill, saw-mill, coke-making, machinery-making and general manufacturing capacity than we ever had before, and in the majority of branches a full output is being made. The iron trade is held under firm control, production being carefully gauged to the market requirements. At present, we are laying less railway mileage than for years, but a surprise may overtake the iron trade in the shape of a sudden activity in railway construction, although very few believe that railway building will be pushed with recklessness. There are now projected 20,000 miles of railroad, and even more, and those directly interested are very anxious to begin work; but the better judgment of those who are behind the active workers counsel still further delay, and it may possibly be another year before many of the well-formulated schemes recently reported are launched. Within the past few days, a large amount of ship and boat building material has been contracted for, for the construction of coastwise and lake tonnage. It is evident, from some statements made by the leaders in these industries, that a very large amount of tonnage will be constructed in the United States within the next twelve months.

There is an urgent demand for tonnage on the lakes and the larger inland rivers. There is a growing sentiment in favor of canal construction, and as soon as the tariff and silver, and one or two other pressing questions are disposed of, the question of internal improvements will come up, backed by a powerful Western influence, second only to that which is now forcing the silver question to an issue. During the past week or ten days, several associations of manufacturers have met, and voted either to maintain current prices or advance them. The manufacturers of textile goods are not so well situated. The manufacture of textile goods in this country and the heavy importations are keeping our markets crowded with supplies, and our manufacturers are beginning to utter loud complaints at the increasing difficulties surrounding them. Some measure of relief is expected from the passage of the pending tariff bill, but the importers have united to oppose what they claim is the radical policy of the protected industries, and have been quietly but urgently endeavoring to secure the incorporation of certain amendments which will be to their interest. There is a very strong anti-tariff feeling among the commercial interests of the country, especially where their business is threatened, as they believe it to be in the present instance. Public opinion seems to be undergoing something of a reaction from the very strong position taken during the last political campaign. The manufacturing interests feel the change of sentiment, and are restless under the evidences of a greater or less popular discontent at the proposed increase of duties in particular lines. The machinery-making establishments of New England are all actively engaged; those making specialties are reported as having three to four months' work in hand. The demand for steam-engines of unusual capacity is particularly notable, and makers are compelled to increase their facilities to meet the increasing requirements. The drift of enterprise, just at present, seems to be towards securing land, erecting manufacturing establishments, opening mines and constructing railroads now while material is cheap, in view of a probable booming activity and high prices in the future. Every capitalist is anxious to place his money in land, mills, mines, furnaces, in any channel where early returns are probable. Investors are crowding past each other in their haste to secure what they believe to be exceptional opportunities. There is danger in all this rush; but judging from the successes which have attended recent investments, though enterprise may be crowding ahead in the direction of danger, it has not yet actually encountered it.

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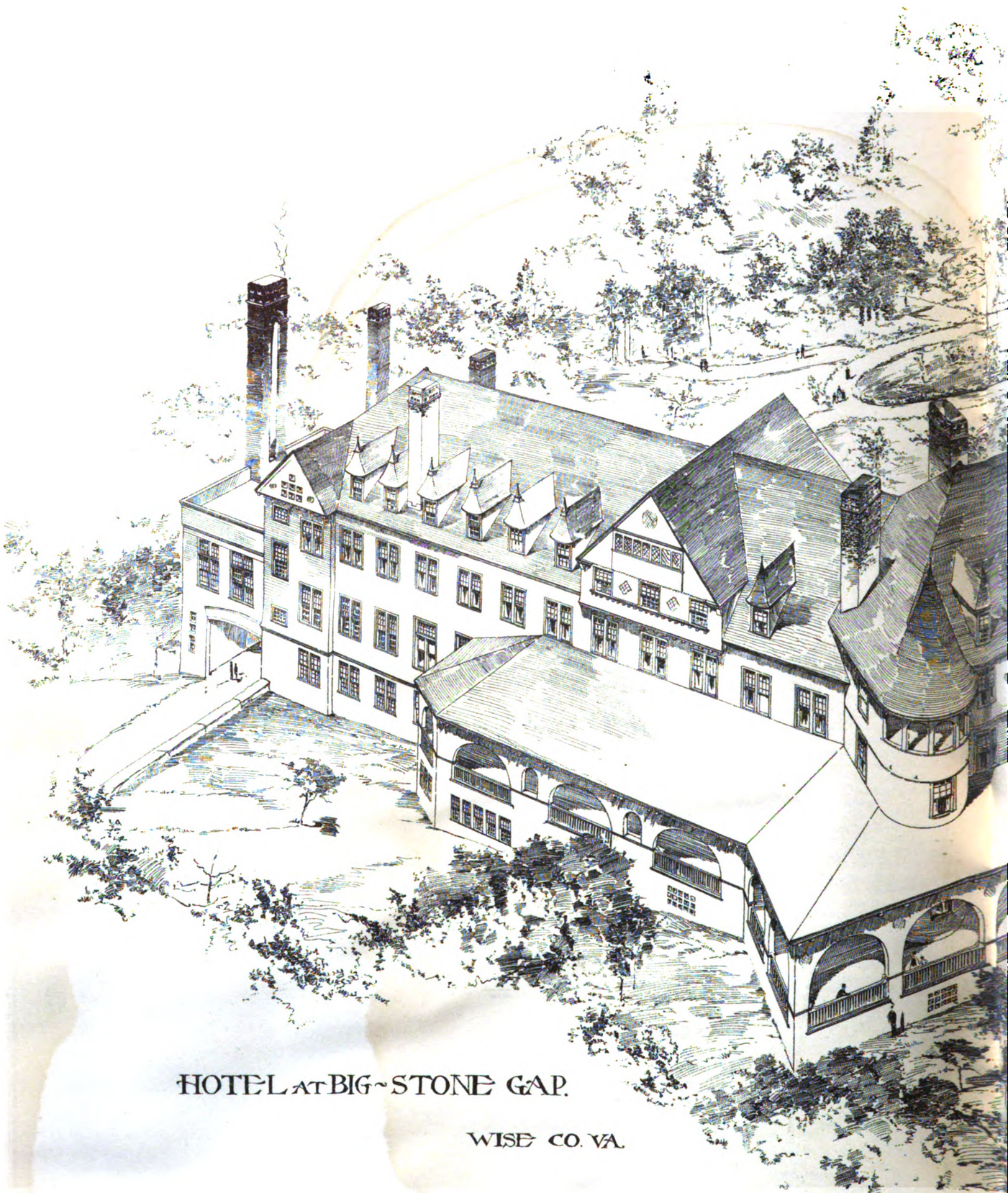

HOTEL AT BIG-STONE GAP.

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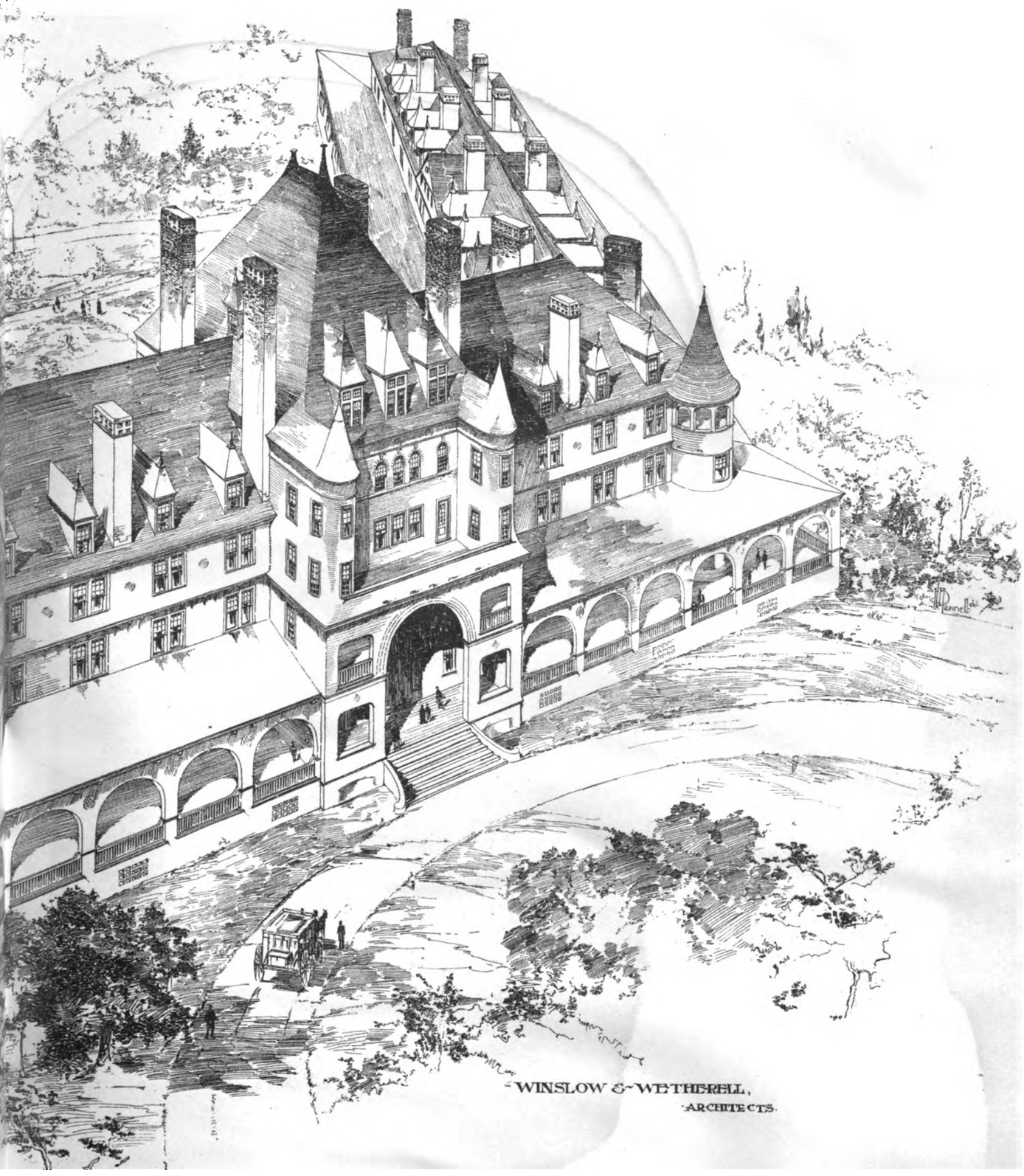

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Vienna
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SKETCHES BY A SCOTCH TRAVELLING SCHOLAR.

Venice
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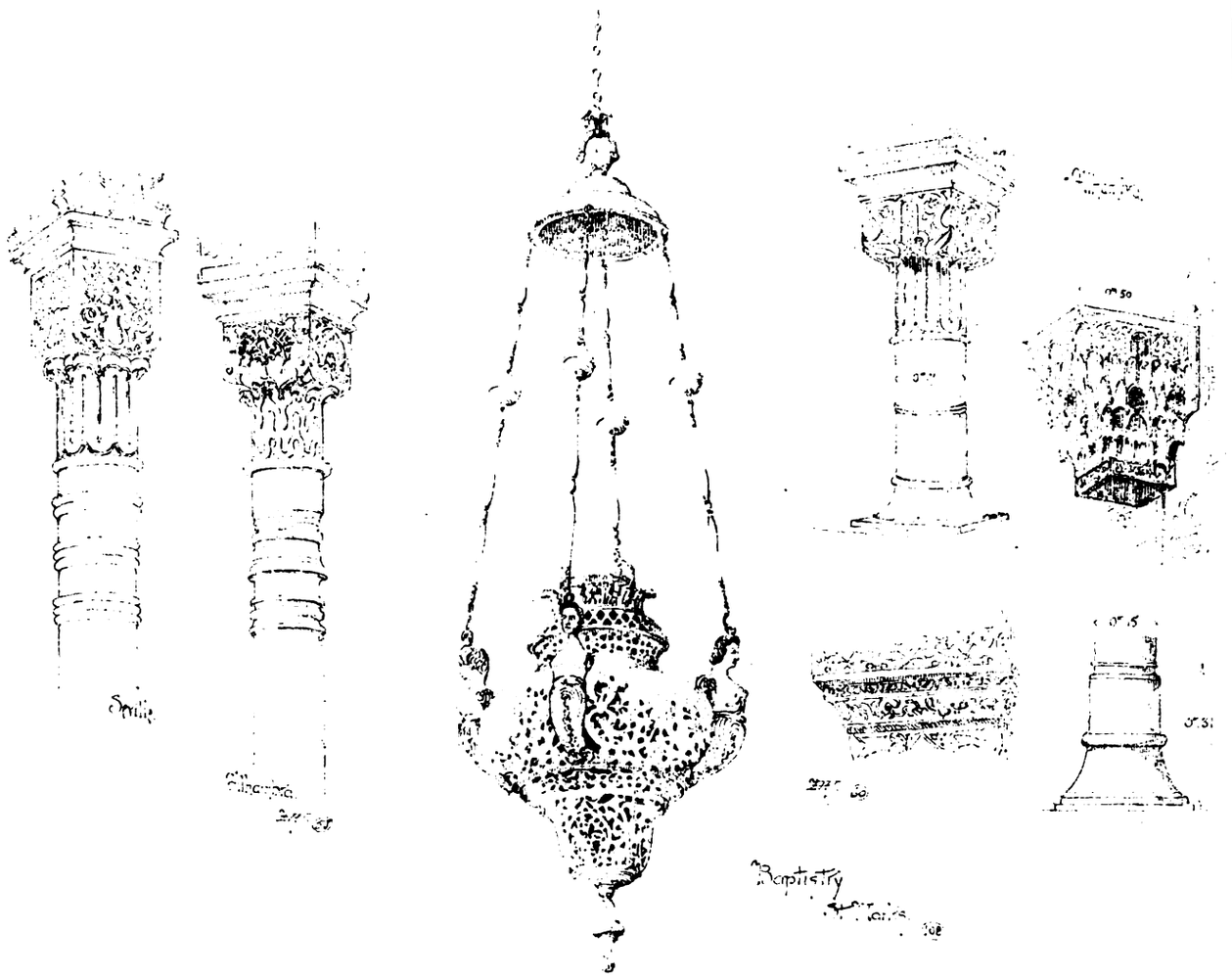

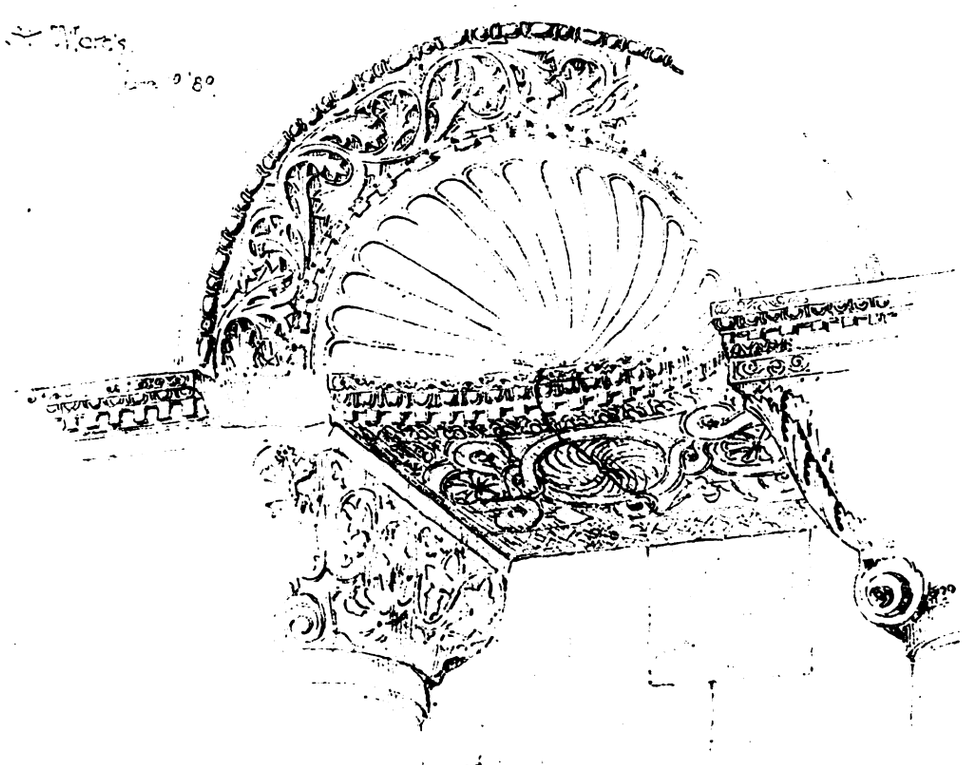

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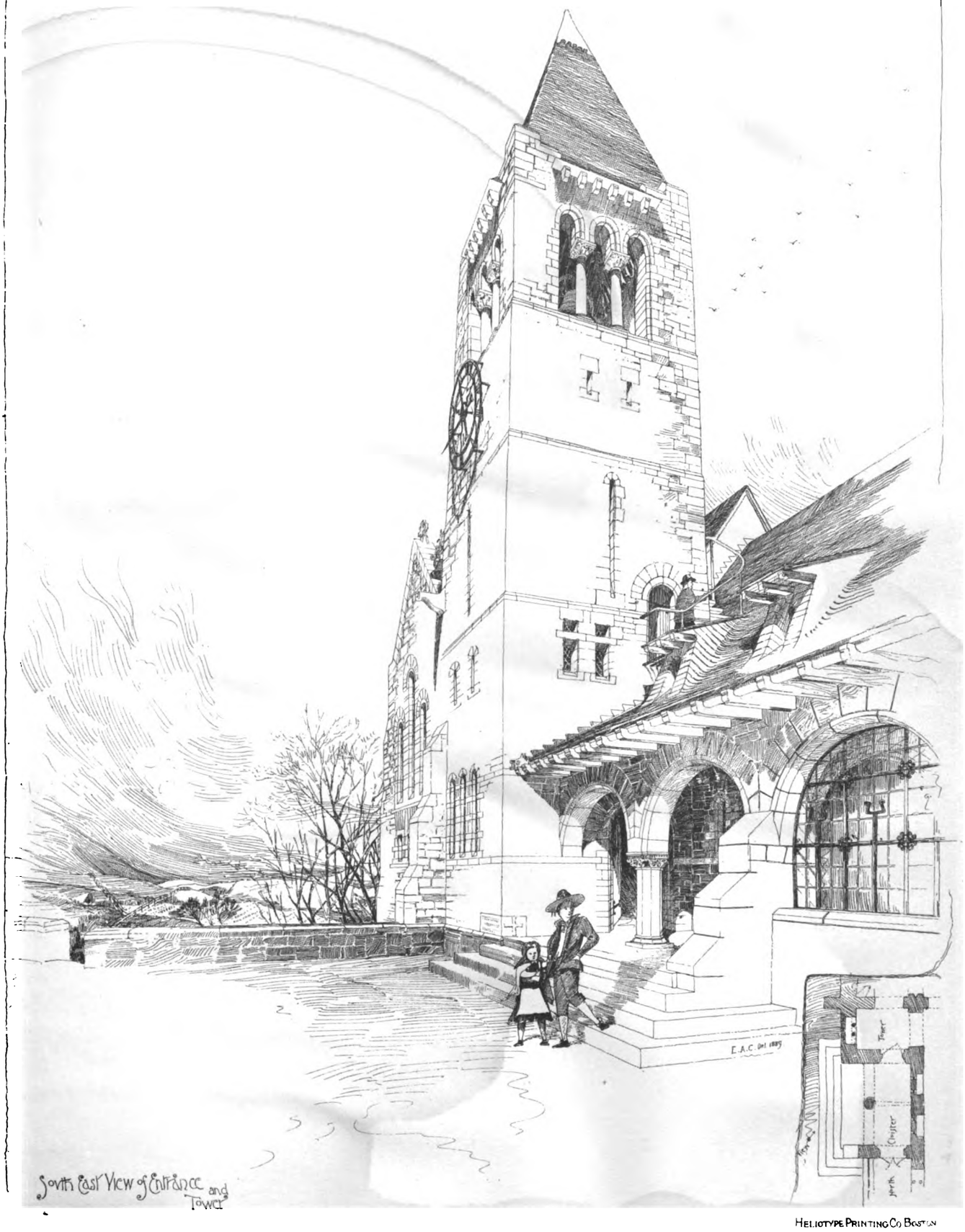

South East View of Entrance and Tower

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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MAY 31, 1890.

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THE new building of the American Fine Arts Society, of which the Architectural League is an important portion, is to be situated on West Fifty-seventh Street, between Broadway and Seventh Avenue, immediately adjoining the Osborne apartment-house. The building will have seventy-five feet frontage on Fifty-seventh Street, and will be two hundred feet deep, extending through to Fifty-eighth Street. The site is an excellent one, being very central and accessible. The price paid for the land is said to have been one hundred and fifty-four thousand dollars, or a trifle over ten dollars a square foot. There will probably be a competition for the plans of the building, but excavation is to begin at once, and it is hoped that the rooms will be ready for occupancy before the winter of 1891.

A RATHER important decision has just been rendered by the Supreme Court of Pennsylvania in regard to mechanics' liens. It seems that it is common, in building contracts in that State, for the contractor to agree not to file mechanics' liens against the estate. The question to be decided was whether this prevented sub-contractors, under the general contractor, from filing liens, in case they were afraid that they might not otherwise get their pay. The decision of the Supreme Court is that such a stipulation in the agreement of the general contractor cuts off the right of sub-contractors to enter liens. In the language of the Court, "Sub-contractors are bound to do just what their principal was bound to do, because they assumed to perform his contract with the owner, to the extent of their undertaking, and, of course, they must perform according to his limitation." This is in accordance with the legal principle that sub-contractors "cannot have the benefits of the builder's contract without accepting the conditions upon which those benefits are conferred." No doubt every one will acknowledge the justice of these remarks, but persons of a reflective turn will notice the curious contrast between such legal deductions and the whole system of mechanics' liens, which consists simply in the issuing of a piratical license to carpenters, plumbers, bricklayers and other building workmen, to fall upon an innocent owner, and extort from him money due them from some one else, whenever they take it into their heads that it would be less troublesome to collect it from him than from the real debtor. As to the sub-contractors, it is likely that they, on the politicians' principle, that a poor man is justified in appropriating what he wants, wherever he sees it, have quite as much right to the help of the lien law as the principal contractors; but the Court says that they "are bound to know, by necessity, all the terms of the contract made by their principal in any event, and they, therefore, know of the prohibition"; and there, is consequently, "no hardship" in "enforcing a provision prohibiting liens against them." In point of fact, sub-contractors probably rarely know the terms of the contract into which their principal has entered, but the building community will not suffer much from a slight restriction of the legalized plundering which persons inexperienced in business dread so much, and which undoubtedly checks the improvement of real-estate.

THE Salt Lake *Herald* ought to have the credit of proposing the application of an old idea to a new purpose. It is well-known to architects that, in Scotland, real-estate may be divided by horizontal, as well as vertical planes, so that a man may be the absolute owner of a given story, or "flat," in an apartment-house. In New York, a somewhat similar plan is made applicable to the "Home Club" apartment-houses, so that a man may be practically the owner of a certain set of rooms in the house, although, if we are not mistaken, the law does not allow him directly to give a deed or a mortgage of his portion. Under the usual arrangement, however, by which each owner's interest is represented by a given number of shares, the shares may be transferred or pledged like any other personal property, so that a proprietor is really quite as free to sell his apartment as if it were an independent house. Until now, this system has, in this country, hardly been adopted outside of New York, and it is there confined to apartment-houses; but the Salt Lake *Herald* proposes to extend it to office-buildings. By a little legislation, or by legal circumlocution, in case the legislation were not readily obtained, a bank, or an insurance company, or a builders' or real-estate exchange, to say nothing of firms of lawyers or architects, ought to be able easily to agree upon the allotments of the different floors of a building, which they could arrange to suit themselves, and thus make sure of permanent quarters, at low rents, and with themselves for landlords, and with only a small investment of capital. As each owner would be responsible for his own portion, there would be no losses from vacant rooms or dishonest tenants, and, as any portion could be transferred, under suitable restrictions, as is usual with the New York Home Clubs, owners who wished to change could readily sell their interest, which, in a well-planned and well-built structure, would often bring a great advance over the original cost. This has been the case with the best of the New York Home Clubs, and the prospect of profit would be still greater with a good office-building in a location judiciously chosen.

THE carpenters' strike in Boston appears to be near its close, and as this and the equally senseless freestone-cutters' strike have nearly put an end to building operations in the city for this season, it is safe to predict that the more obstinate of the strikers will find nothing to do when they come to their senses, and will have leisure during the remainder of the year to reflect upon the advantages of surrendering the direction of one's actions to other people. Of course, the organizers of the strike claim that they are sure of success, but many things show that they are really desperate, and even their valorous protestations begin to grow somewhat faint. The fact is, that they have had no chance of success from the first. The building season in Boston is short, lasting, for outside work, only from April to November; there are a great many carpenters in the city and the neighborhood, and as those who will do the most work in a day are sure to be preferred by the contractors, most of the men have sense enough not to express great enthusiasm for the eight-hour theory, although they may be dragooned by the leaders into a reluctant support of it. In fact, it is openly declared that the strike was promoted, and is kept alive, by the intrigues of a lot of foreigners, who found the Boston carpenters comfortable and

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happy, and seized on the idea of an eight-hour agitation for getting the citizens out of their employment, and themselves in. However that may be, the progress of the strike has shown that the men entered it unwillingly, and that the leaders have grown reckless at the evident failure of their plans. In many cases, as the servile organs of the labor tyrants have announced, the men who had struck have obtained employment, with an eight-hours' day, and great jubilations have been raised over each instance; but the fact is that in most, if not all the cases, they have simply agreed to work eight hours a day at the old hourly rates, so that the substance of the matter is that some of the more shrewd of the carpenters, not wishing to remain idle, but not daring to offend the bullies, have gone back to their employers on the old terms, simply docking themselves voluntarily for a time of one-ninth of their pay, to keep on good terms with the Union leaders until the storm blows over.

AS to the leaders, the vehemence of their arguments increases as the number of persons who pay any attention to them diminishes, and they are beginning to make the fatal mistake of trying to coerce the contractors by the means which they find effective with the journeymen. A few days ago, a contractor, an elderly and rather feeble man, whose men found themselves quite contented with their lot, and had turned a deaf ear to the blandishments of the walking-delegates, was visited by an official deputation from the managers of the strike, apparently with the idea of compelling him to assist in inculcating the principles of the International Society of Avengers of Labor, or whatever it may be called, upon his unwilling workmen. The contractor proved less open to argument than the delegates expected, and they began to supplement their appeals to his mind by the application of force to his body; and, after hustling him about for awhile, finally seized him by the collar and threw him down on the floor of his own office, and left him there. It may be imagined that this sort of conduct does not strengthen the cause of the strikers, and a day or two afterward the announcement was made that, "owing to the obstinate refusal of the contractors to pay any attention to the demands of the men," it would have been necessary before long to terminate the strike, but that a scheme had been devised by which it would probably be possible "to protract it indefinitely." This scheme consisted, it appeared, in a plan for the organization of a "coöperative society" of carpenters from among the strikers, who were promised ample capital, and would seriously injure the master-carpenters "by bidding for contracts in competition with them." Unfortunately, this is probably pure "bluff," for a "coöperative society" of men pledged to work only eight hours a day would stand about the same chance "in competition" with men who, like most contracting builders, habitually work sixteen or seventeen hours a day, that a cow would in a race with a horse; but that the idea of forming one of these societies, the destined means, as we think, of putting an end forever to trades-union tyranny and labor troubles, should have been allowed to develop itself under the very noses of the Union leaders is something remarkable.

THE Omaha *Republican* laments what it calls the "carelessness of builders" in furnishing houses with windows of sheet-glass, instead of plate-glass, and wonders why "the plate-glass window" should be an exception among Western dwelling-houses. Of course, the obvious answer is that a plate-glass window, counting the extra expense of weights, cords and sashes, costs in this country just about ten times as much as the common sheet-glass sash, and there are few persons who can afford to use them. To people who have seen the plate-glass so universally employed in England and in the French cities, American windows look poor and cheap; but glass such as the English and French use is out of the question for all but the richest Americans so long as the present tariff system remains unchanged. Failing this, however, we might with advantage try to improve the manufacture of the cheaper sheet-glass. It is certainly discreditable to modern ingenuity that a large sheet of double-thick glass, while clear and smooth, is always wavy and unpleasant to look through. The English have a process of "flatting" such glass, and make excellent qualities of it, and it ought not to be very difficult to produce a material far superior to that now found in commerce.

THE National Association of Fire Engineers is to hold a convention this year at Detroit, where topics of great interest to architects will be discussed. Among other matters assigned for discussion this year is the question whether it would be practicable or desirable to have a model building law drawn up by a joint committee of the National Association of Master-Builders and the American Institute of Architects. The feeling among fire-engineers seems to be strongly in favor of a uniform law prepared in this way, and there is no doubt that the preparation of a standard form would greatly promote the adoption in cities of better modes of building, while it would save much labor on the part of local committees, who have, wherever building regulations are under consideration, to spend a great deal of time in smoothing over difficulties raised by selfish interests.

WHAT seems to be a reasonable project for a high tower has been formed by some Washington architects, and there is some prospect that it may actually be erected in Chicago within the next two years. The structure is intended to be fifteen hundred feet high, the base being about four hundred feet in diameter, and composed of a mass of domes, pinnacles, towers and so on, out of which rises a cylindrical shaft, braced by lattice-work on all sides. The design, as published in the Chicago *Tribune*, is not entirely beyond criticism, but we can conscientiously say that we like it better than that of the Eiffel tower. Of course, the main object of the structure is to serve as a curiosity, but it will make a good lookout station, and the termination is formed by a glass globe thirty feet in diameter, intended to contain a group of electric-lights, which will be visible for at least fifty miles. The material is, naturally, iron, cast, wrought and corrugated, and the cost is estimated at two million dollars; whether it can be built for this, with structural iron at three cents a pound, remains to be seen, but we should like to have the experiment tried.

THE official *atelier* in the School of Fine Arts in Paris, which was directed by the late Mr. André, has been taken, by appointment from the Government, by M. Moyaux, who is also made Professor in the School. For some unexplained reason, the appointment of M. Moyaux, who is an architect of the highest standing and accomplishment, seems to have upset the rather delicate susceptibilities of the pupils in the André *atelier*, and they went over in a body to M. Laloux, carrying off with them as mementos a large part of the André furniture. This demonstration probably produced less impression than was intended, and the Government of the School simply bought some new furniture, and installed M. Moyaux, with twenty pupils, whom he brought with him.

THE second annual competition in the Ecole des Beaux-Arts for the American prize, the Prix de Reconnaissance, has resulted in the award of the prize to M. Baubain, a pupil of the late M. André. The subject of the contest this year was "A Light-house on Thompson's Reef, in Florida."

ONE of the former pupils of the *Atelier* André addresses to *La Construction Moderne* a correction of the story about the revolt in the *atelier* against M. André's successor, and, with the story, we can hardly do less than publish the correction. It seems that the desertion of the pupils of the *atelier* in a body, on the appearance of their new professor, and their emigration to the *atelier* of M. Laloux, was due to the fact that M. Laloux had for a long time supplied M. André's place during his absences from Paris, and took his pupils during his last illness. He had, therefore, come to know the pupils and their work, while they had become warmly attached to him. On M. André's lamented death, a strong effort was made to have Laloux appointed to succeed him; but it failed, and, after the appointment of another, the pupils decided that it would be better for them to remain under M. Laloux's care, in his private *atelier*, paying for it the usual fees for private instruction, than to take up with a new master, although their tuition would be free, so long as they remained in the official *atelier*.

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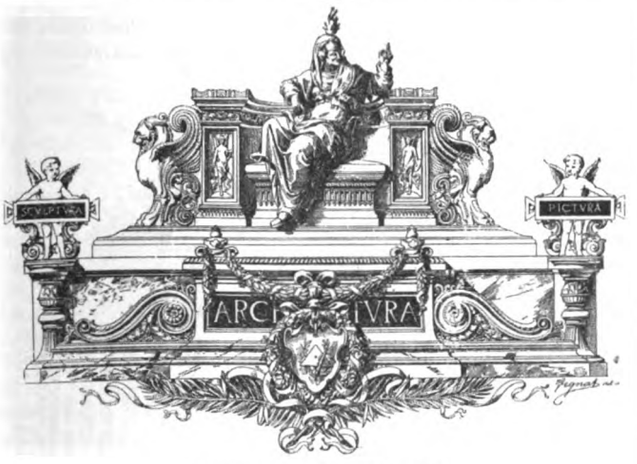
RELIGIOUS ARCHITECTURE.[1] — VIII.

IV. RELIGIOUS ARCHITECTURE OF ANTIQUITY. — ROME.



Composed by M. Vignat, Architect.

THE Romans ascribed their initiation into the true appreciation of art wholly to Greece, asserting that, up to the time when they came under Greek influence, they had remained in a rude and uncultured state, and their hands had been trained solely to wield weapons and drive the plough. In these assertions they wronged their real progenitors; modern research has brought to light very clear proofs of Etruscan influence on the development of the arts as well as the civilization of Rome — an influence which the Romans sought to conceal, but which none the less prevailed for centuries.

The walls of primitive Rome, *Roma quadrata*, which were unearthed a few years ago, are Etruscan in the shaping, size and laying of the stone. The cloister or *atrium* of Vesta, constructed under Numa, consisted of a court surrounded by four wooden porticos; this was copied from already existing edifices in the Etruscan city of Adria. To digress for a moment, we may call attention to the fact that these cloisters, with cells all opening on a quadrangular gallery, might be considered as the prototype of similar constructions belonging to Christian art.

The cistern built later at the foot of the Capitoline Hill, which afterwards became the Mamertine prison, still exists in part, and was evidently due to Tuscan workmen.

Rome was then subjugated by the kings of Etruria, and it is this fact that Roman historians desired to efface forever from the annals of history. The Etruscan rulers surrounded the city with ramparts which may be recognized to-day in the *Vigna Macarona* and beneath the convent of Saint Sabina. The *cloaca maxima* was begun; the two temples of Fortune were reared, as well as the Temple of Diana on the Aventine, the temple of Jupiter Latialis, and, finally, the celebrated sanctuary crowning the Capitoline Hill, which existed down to the time of the great fires at Rome. Vitruvius has left us a description of it; it comprised in fact three sanctuaries, dedicated to Jupiter, Minerva and Juno, and surrounded by a common peristyle. Construction, proportion, decoration, everything was Etruscan.

Fig. 1. Façade of an Etruscan Temple (6th Century B. C.). After Lubke.

After the fall of the Tarquins, Rome attempted to shake off the yoke of the Etruscan kings, but she was again subdued by Porsena.

Rome's artistic relations with Etruria were not interrupted when she had regained her independence. As is well-known, an important colony of Tuscan artists, including goldsmiths, sculptors, manufacturers of arms, mirrors and candelabra, occupied the street bearing the name of *Tuscus vicus* at the foot of the Capitoline and Palatine hills. It may be said that during the Republic the manufacture of objects of art remained chiefly in their hands.

The burning of Rome by the Gauls furnished the occasion for a complete restoration of the city. As yet there was no question of Greek influence; and still, in the fifth century B. C. an already flourishing art, derived from Etruscan sources, was

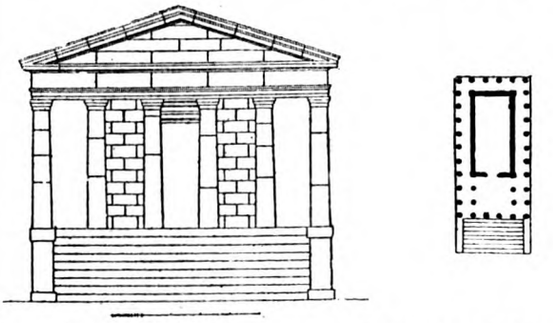


Fig. 2. Plan and Façade of the Temple of Juno Matuta, or of Pietas, at Rome (2d Century B. C.).

rearing the great temple of Jupiter Capitolinus, the temples of Hercules, of Saturn, of the Dioscuri, of Ceres and of Bellona. As for works of public utility — roads, bridges, aqueducts, the forum, circuses and so on — great activity was displayed in their construction.

In entering upon the inheritance left by the Etruscans, as in receiving later that of the Greeks, the Romans put a new and original stamp upon their works. The Etruscans had bequeathed to them the semicircular arch and vault; the Romans

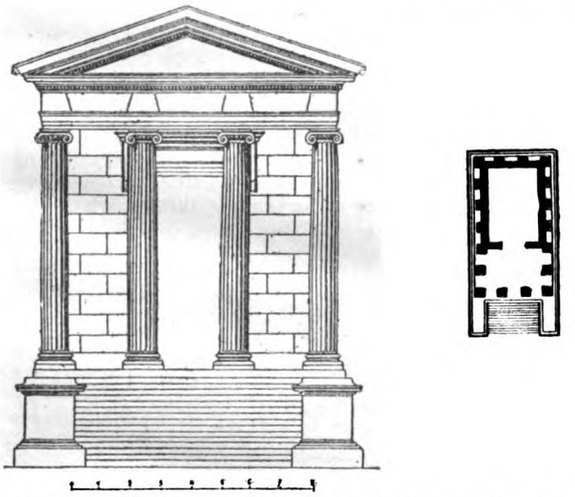


Fig. 3. Plan and Façade of the Temple of Fortuna Virilis, at Rome (1st Century B. C.).

employed it in constructing bridges and aqueducts of several superimposed stories, and of a grandeur and strength which even now powerfully impress us. Their triumphal arches surely exhibit a most characteristic phase of art.

It was after the conquest of Magna Græcia that contact with Greek civilization was established and that Greek influence on art began to be evident. It met, however, with determined resistance; the spirit of the old Romans struggled long against this invasion of customs and tastes which seemed to them to form the train of effeminacy and corruption. When Marcellus built the temple of Virtus and Metellus reared the two temples to Jupiter Stator and Juno, the Pontifices and the Senate viewed with an evil eye innovations imitated from Greek art, and they raised difficulties of all sorts to arrest or retard their consecration. When, under Sulla, it became necessary to rebuild the ancient temple of the Capitolium, which had been burned, no thought of change in the original

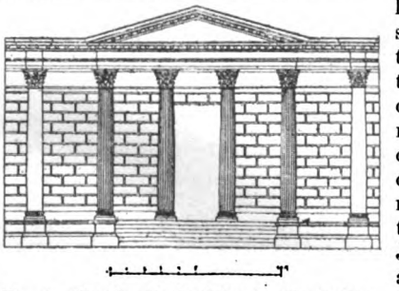


Fig. 4. Façade of the Temple of Jupiter Olympus (2d Century A. D.)

[1] From the French of P. Planat, in Planat's "*Encylopédie de l'Architecture et de la Construction.*" Continued from page 112, No. 752.

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plan and design, to suit the new forms, could be entertained, and the old dispositions were faithfully reproduced. Cæsar, too, when he erected the temple of Venus Genitrix, conformed to the old style.

Even when Greek influence had thoroughly asserted itself upon Roman art, the latter by no means lost its originality. must not be considered as mere copyists from the Greeks. Here, too, their work has a grandeur all its own.

"Those who, in thought, subordinate Roman art to the Greek lose sight of the fact that the fundamental principles of construction adopted by the two nations were most dissimilar. One made exclusive use of the beam and of horizontal sup-

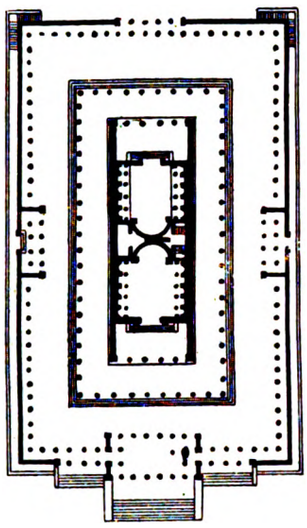

Fig. 5. Plan of the Temple of Venus and Rome, at Rome (2d Century A. D.).

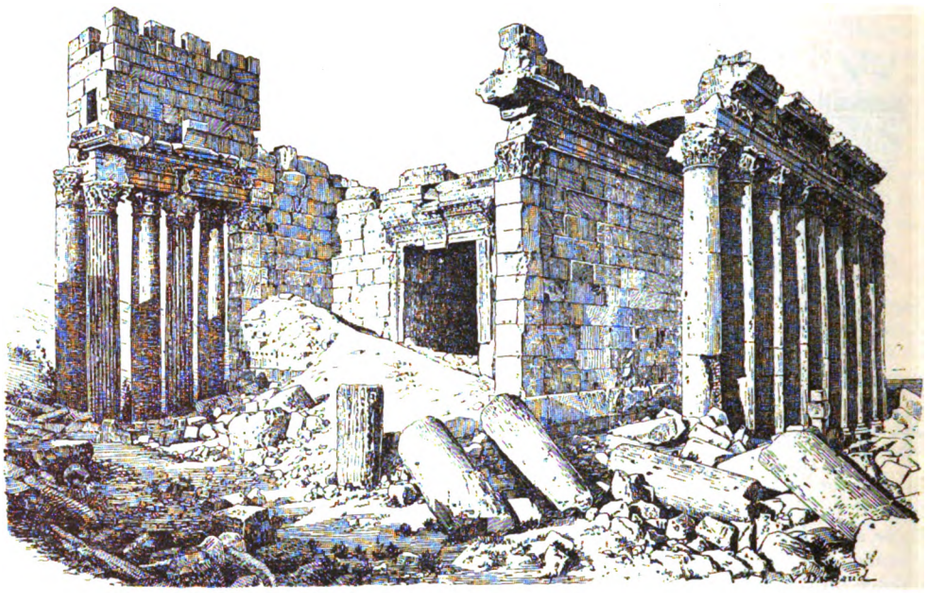

Fig. 6. Ruins of the Temple of the Sun, at Baalbek (2d Century A. D.).

Its most original and most imposing works are without doubt to be sought in public rather than in religious architecture. "When there was a demand for improved sanitary arrangements in the city, when it was to be fortified, when springs and wholesome waters were to be brought thither, when it was necessary to prepare fit assembling places for the people, to

ports, the other preferred the semicircular arch and vault; one chose only massive material, resting the joints on columns or widely spaced pillars, the other employed brick, rubble-work or pozzuolana, casting their structures on gigantic moulds; one levelled the ground and harmonized it with the tranquil lines of the horizon, the other lifted itself boldly toward heaven, or

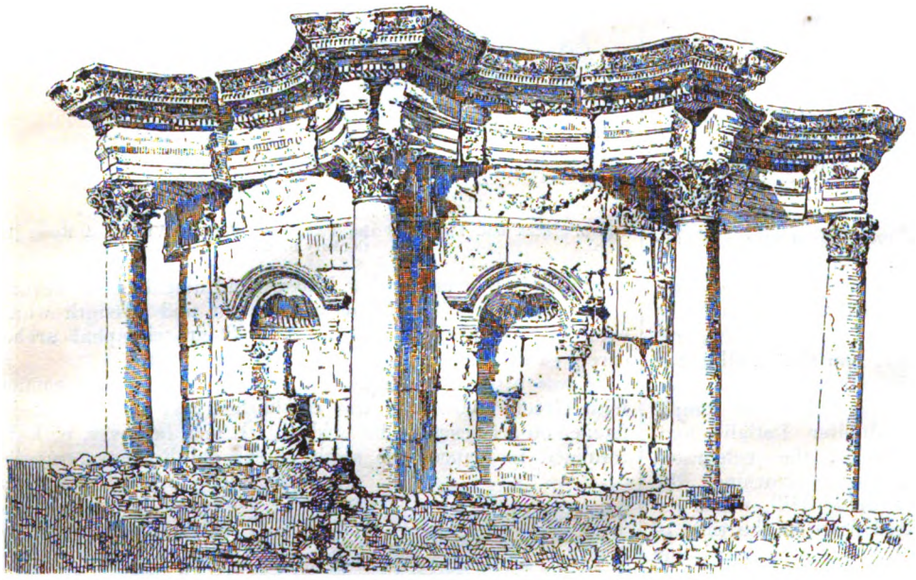

Fig. 7. View of the Circular Temple of Baalbek (2d Century A. D.).

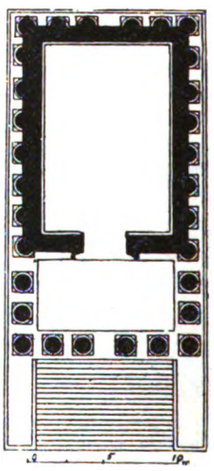

Fig. 8. Plan of the Maison Carrée at Nimes (2d Century A. D.).

protect political life under all its forms, to dry up the marshes, to fertilize the fields, to build bridges over the most impetuous torrents, and to build roads that would carry their armies to all the borders of Italy, the Romans borrowed nothing from the Greeks, but deserved rather to serve as their masters; they created models which the rest of the world has often despaired of equalling."[1] In monumental architecture even, the Romans

upheld enormous weights on the soil. Let no one believe as many do, that Roman art attained its grandeur only in the Augustan age, because it had been fed from all the marrow of Greek art; it was under the Republic that the most beautiful types were created. The Empire merely enlarged and multiplied the examples which centuries of liberty had bequeathed to it.

". . . The Greeks devoted themselves to proportions, and

[1] Beulé. "*Prejugés sur l'art Romain.*"

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by their aid they made what was small appear great; the Romans loved material grandeur, and sought not only the impression but the reality of grandeur. The Greeks delighted in exquisite forms and carried delicacy to a marvellous perfection; the Romans looked for strength, character, stability and endurance. For the first, beauty was the supreme end; for the second, utility. The Greeks lived in the ideal world, dreaming new types and holding converse with those charming gods which they were ever creating and ever rejuvenating; the Romans were of practical mind, they struggled with the real world. The State was their god, public interest their dream; their grand poetry was ambition. The Greeks lovingly adorned a little city or a celebrated sanctuary, but they could soon provide for the needs or the decoration of a country which did not reach beyond the walls of fortification; the Romans were preparing for the government of the world, they embellished their city as its capital, they conceived everything on a stupendous scale, as though they were one day to offer hospitality to the universe. To the Romans, art was merely an instrument, a means of securing their empire, a mark of possession, the seal stamped upon conquered lands."

The origin of Roman art is, then, to be sought in Etruscan architecture, at least so far as its early years are concerned. Few traces now remain of Etruscan constructions. We know, from Vitruvius, that the primitive temples of Tuscan Etruria offered nearly the same dispositions as those of Greece. In front, there was a portico of four columns (Figure 1); the cella, made in a rectangular plan, was divided into three naves, or distinct cellæ, the middle one being consecrated to the chief divinity. Thus, in the first temple of Jupiter Capitolinus, at Rome, built in the Etruscan style, the central cella was dedicated to Jupiter, and the two lateral ones to Minerva and Juno. It is, however, possible that what is here given by Vitruvius as a rule was only an exception; the ruins of the temple of Vulci would seem to indicate that such is the case. It is unquestionably true that the entablatures were without exception constructed of wood; and they continued to be so constructed for a long period.

Later, when close relations had been established with Greece, and Rome had come under Grecian influence, which lasted, we may say, in art as in letters and science, as long as the Roman Empire itself, the temples were reared after Greek models.

General dispositions and variations were alike unchanged. The classification set forth by Vitruvius, and borrowed by him from contemporary Alexandrine authors who had reduced the principles of architecture to rules and canons, applies to Greek edifices as well as to Roman.

[To be continued.]

SAFE BUILDING.[1]—XLI.

CHAPTER X.—PLATE AND BOX GIRDERS.

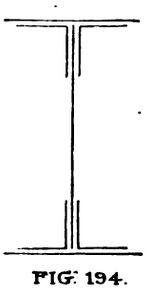

FIG. 194.

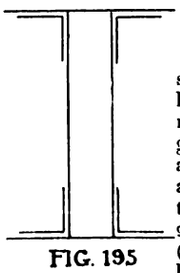

FIG. 195

WHEN it becomes necessary to cover floors or spaces of such large span, or to carry loads so heavy, that rolled-beams will not answer the purpose, girders are made up of plates and angles riveted together, and are known according to their section as "riveted plate girders" with single webs (Figure 194), "or riveted box girders" with two or more webs (Figure 195). As a rule, too, riveted girders of equal strength can be more cheaply manufactured than the heavier sections of rolled beams.

Single web girders.

In the case of the former the vertical plate or web has two angle irons riveted horizontally along its entire top edge and the same along its bottom edge, or four in all. In very light construction the free legs of the angles might answer for the top and bottom flanges, but, as a rule, a plate is riveted to these free legs, at right angles to the web, both top and bottom, thus forming the flanges of the girder. This plate need not necessarily extend the entire length, but it usually does. Where the thickness of flanges required is very great, say one inch or more, each flange is made up of two or more thicknesses or layers of plates.

In such cases only the layer nearest to the web is carried the entire length, the other layers gradually decreasing from the point of greatest bending-moment (usually the centre) towards the ends.

To carry all the layers to the ends in heavy work would be a great extravagance, the only advantage gained being a slight increase in stiffness, which can be very much more readily and economically gained by increasing the depth of web.

Box girders.

In double web box girders only two angles are attached to each web, one at the top and one at the bottom, both on the outside surface of each web. To place angles on the inside surface is impracticable, as webs would have to be placed sufficiently far apart for the "holder-up" to crawl in, and the riveting would not only be weak, having to be done by hand, but it would weaken the flange by just so many additional rivet holes. In short girders with heavy loads, where shearing is the main danger, box girders with three webs are sometimes made; in that case the middle web has the usual four angles, but the two outside webs only two angles each.

Beyond the additional stiffness sideways, in resisting lateral flexure, there is no particular advantage in using a box girder. It is more clumsy to handle and to make, and not readily painted on all exposed surfaces, and besides is more extravagant of material in proportion to its strength. Where the flange is of great breadth and it becomes desirable to have two or more webs, the writer always prefers to use two or more single web plate girders, and to secure them together with bolts and separators, or by latticing the top and bottom flanges, together.

The angles need not necessarily be even-legged; nor need the web necessarily be of same depth throughout, nor of same thickness throughout. It will, however, greatly simplify the calculation to keep the web uniform throughout, and in most cases the extra labor involved in varying the thickness of web, would more than offset the cost of the unnecessary material at the centre.

Where girders are very deep, the web is made in sections or panels, as already explained. In such cases the web can readily and economically be thickened towards the ends.

Cambering girders.

Whenever possible, the girder should be cambered up at the centre an amount equal to the calculated deflection. But as girders are usually made of straight plates, and machine riveted and punched, the cambering is rarely practicable. Should the girder, however, show any bending or cambering in transportation, the architect should be sure to have the cambered side placed on top.

The calculation of riveted girders is exactly the same as for iron beams, but has the additional element of the number and location of rivets to be looked into, also the stiffness of web and overhang of flanges.

The reactions, vertical shearing, bending-moments, actual and required moments of resistance, deflections, etc., can be calculated arithmetically by the rules given in Chapters I and VI; or graphically by the rules given in Chapter VII.

The rules for calculating riveted work were given in the previous chapter (IX).

Horizontal flange strain.

The only new matter is to find what the strain on the rivets will be. It will be readily seen that when a plate girder is loaded the tendency of the flanges and angle irons is to slide horizontally past the web (see Figures 120 to 125).

This tendency to slide is called the horizontal flange strain. The rivets connecting angles to web resist this tendency and there must be sufficient rivets to do this safely.

The total amount of this tendency to slide or horizontal flange strain between any selected point of girder and the *nearer* end of girder, is equal to the bending-moment at the selected point, divided by the depth of web of girder at the point, or

$$s = \frac{m}{d} \qquad (121)$$

Where s = the total strain, in pounds, coming on all the rivets connecting *either* top or bottom flange to web, between any selected point of girder and the nearer end.

Where m = the bending-moment in pounds-inch, at the selected point of girder.

Where d = the total depth, in inches, of the web of girder at the selected point.

The above strain s will exist in both top and bottom flanges and will be resisted by all the respective rivets in *either* top or bottom flange that connect the angles to the web.

Number of rivets in web leg of angles.

It should now be ascertained which is the weakest resistance of each rivet, whether it be to bearing (compression), to shearing, or to bending, and this weakest resistance divided into strain s, as found by Formula (121) will, of course, give the number of rivets required along *each* edge of web between the selected point and the nearer end of girder. Frequently many more rivets will have to be used than are required by calculation in order not to exceed the greatest pitch for rivets given in Formula (107).

To ascertain the number of rivets required (along either web edge) between any two points of girder, we will, of course, take the difference between the numbers required from each point to end of girder.

In the flange leg of angles usually fewer rivets can be placed than in the web leg, though many good engineers frequently make them equal in number. But this is really unnecessary, for even if the strains on the flange rivets were the same as those on the web rivets

[1] Continued from page 56, No. 748.

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(which they are not) we should still have two rivets in the flange to one in the web on all single plate girders.

Number of rivets in flange leg of angles.

There seems to be considerable difference of opinion as to just how to figure the strain on the flange rivets. The best course would seem to the writer to be, to assume that each flange cover plate must transfer at each of its ends, by rivets, to the angle iron and parts of flange plates between it and the angle iron, an amount equal to the safe stress the plate is capable of exerting (that is, net area of cross section of the plate multiplied by either the safe compression stress $\left(\frac{c}{f}\right)$ or by the safe tensional stress $\left(\frac{t}{f}\right)$ as the case may be).

This amount should be transferred by sufficient rivets, between the end of each plate, and the point of girder at which the full thickness of the plate is required to make up the required moment of resistance. From this point to centre the rivets can be spaced according to the rule for greatest pitch, Formula (107), but when rivets are so spaced the pitch of the rivets immediately nearest the ends of any cover plate should be greatly decreased for a distance of three or four rivets at each end.

By the above method the amount of strain on rivets can be quite accurately computed.

Locating flange rivets.

The simplest method of locating rivets is to construct what might be called the curve of moments of resistance. This can be done as shown in Figure 151, Chapter VII (where *C D E F G C* is the curve of moments of resistance), or we can calculate arithmetically the required moments of resistance at several points of girder, and lay out the curve as

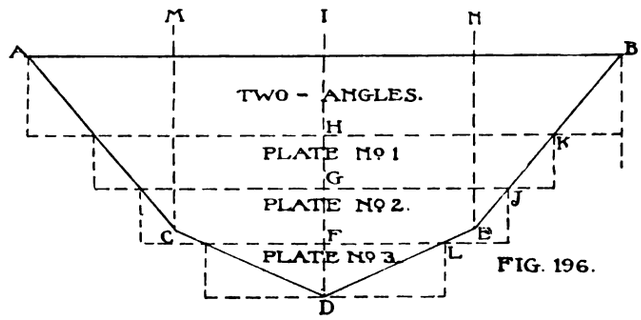

FIG. 196.

shown in Figure 196, where *A B* represents the length of girder, and *M C*, *I D* and *N E* the calculated required moments of resistance at points *M*, *I* and *N*.

The curve of moments of resistance is, of course, *A C D E B*, and its axis or base *B A*.

We now make $I H = a, d$ see Formula (99); a, being the net area of cross-section in square inches of two angles, and d the total depth of girder in inches.

H D will now represent the total required thickness of flange plates, which we can find from Formulæ (36) or (98).

We will decide to divide it into three layers *H G*, *G F* and *F D*. We draw the lines as shown and find that plate No. 1 can stop at *K*, though we decide to run it full length, it is, however, needed of full thickness at *J*. Again plate No. 2, can stop at *J*, but is needed full thickness at *L*. The top plate, of course, will run from *L* to centre. The left half of girder, will of course be similar, the loads evidently being symmetrical each side of centre. In practice the plates rarely are stopped at the exact points calculated, but are usually extended beyond these points a distance equal to from once to twice the width of plate.

There must now be rivets enough between *D* and *L* to equal the efficiency of plate No. 3, between *L* and *J* to equal the efficiency of plate No. 2 and between *J* and *K* to equal the efficiency of plate No. 1. If there is not room to get them in the plates must be sufficiently extended to get them in, that is No. 3 must be lengthened beyond *L* and towards *J*; No. 2 must be lengthened beyond *J* towards *K* and No. 1 carried on towards end.

Regularity of spacing.

In laying out the rivets they should be as regular as possible, the best method is to lay out the total number of rivets required from centre to end, gradually decreasing the pitch towards ends, and then to make each of the plates No. 3, No. 2 and No. 1 of sufficient length beyond their respective point *D* (for No. 3) *L* (for No. 2) and *J* (for No. 1) to take in the number of rivets required. The length may always be more than shown in Figure 196 without harm, but *never less.*

We should have then for the bottom flange:

Number rivets in end of each flange plate.

$$x = \frac{a.\left(\frac{t}{f}\right)}{v} \qquad (122)$$

Where $x =$ the number of rivets required in each end of each flange plate between its ends and the nearer points to ends at which its full strength is required by the girder.

Where $a =$ net area of cross-section of the flange plate, in square inches (less rivet holes), at its weakest section.

Where $\left(\frac{t}{f}\right) =$ the safe tensional stress, per square inch of the material. For top flange use $\left(\frac{c}{f}\right)$ and look out that rivets are not so far apart as to cause bending or wrinkling of plates.

Where $v =$ the safe stress, in pounds, or least value of each rivet. That is the bearing, shearing or cross-breaking value of the rivet, whichever is the smaller.

The rivets in the flanges will, of course, be cantilevers, loaded with their respective amounts of $a.\left(\frac{t}{f}\right)$ or $a.\left(\frac{c}{f}\right)$ respectively, a being the area as given in Formula (122). The free end of canti-lever will be of a length equal to the thickness of the respective flange plate, or equal to the thickness of leg of angle iron, whichever is the smaller should be used.

Value of rivets.

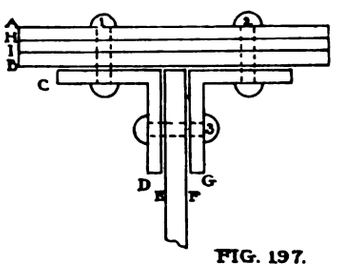

FIG. 197.

The bearing area will be the diameter of the rivet multiplied by the same smaller thickness.

In single plate girders the shearing of *rivets will* rarely determine their number, this will generally be more than the bearing or bending value.

Figure 197 shows clearly the way in which rivets are strained.

The web-rivet, No. 3, is *bearing* against web on the surface *E F*, and against angles on the two surfaces (sum of) *D E* and *F G*. The rivet has two cross-shearing areas, at *E* and *F*. This rivet is a beam supported at *D E* and *F G* and loaded uniformly with its share of horizontal flange strain, which it is transferring to web.

The flange rivets, Nos. 1 and 2, we will suppose are connecting the flange plate *A H* to the angle iron. Their bearing then is against *A H* and in the opposite direction against *B C*, the lesser should be used. Their shearing area is *either* along the line *H* or the line *B* according to which end is considered the cantilever, so that they have only one shearing-area practically in the calculation, instead of two as with the web rivets.

Then rivets Nos. 1 and 2 are cantilevers and are built in *either* from *H* to *C* and loaded uniformily on the free end *A H*, or built in from *A* to *B* and loaded uniformly on the free end *B C*, whichever projection *A H* or *B C* is smaller should be used. The load on the cantilever being as already explained equal to each rivet's share of an amount equal to the net-area, of top plate *A H* multiplied by the safe tensional or compressive stress per square inch of the material.

There is, of course, a tendency of the plates *H I*, *I B*, etc., to slide past each other and past angles.

Plate tendency to slide.

This tendency will exist particularly at the centre of girder and in those parts of rivets which simply tend to hold the plates together after the plates have once transferred their strength and become a permanent part of the flange. But this tendency rarely amounts to much, unless the plates are very thick; and if the rivets are spaced according to rules given can be overlooked. If it is desired to calculate the strain on each rivet, due to this tendency of the flange plates to slide past each other, it can be done by the following formula, which assumes that at any right angled cross-section of flange through rivets there are always two rivet holes.

$$v = \frac{b}{d}.(x-y)^2.\left(\frac{k}{f}\right) \qquad (123)$$

Where $v =$ the safe value or stress on any flange rivet, in pounds, to resist the tendency of any two flange plates (or plate and angle leg) to slide past each other.

Where $b =$ the total breadth of flange plate, in inches.

Where $d =$ the total depth of girder, in inches.

Where $x =$ the distance, in inches, from the horizontal neutral axis of girder to centre of flange plate, further from neutral axis.

Where $y =$ the distance, in inches, from the horizontal neutral axis of girder, to centre of flange plate (or centre of flange leg) immediately next to other plate, but on the neutral axis side of same.

Where $\left(\frac{k}{f}\right) =$ the safe modulus of rupture, in pounds, of the material.

Splicing girder plates.

If any part of a girder, either web or flange, is spliced, made of two parts, the number of rivets *each side of splice*, and the amount of *additional* cover plates, etc., should be made sufficient to transfer the full strength of original plate across the joint.

In locating the rivets of a splice care should be taken not to weaken the original plate by holes not allowed for in the original calculation of moment of resistance of the section. There is no difficulty in splicing webs, as cover plates can be put on each side, and the strains in the web are comparatively small.

Web-splice.

These (web-splice) plates and their rivets *each side of* joint should be of sufficient strength to transfer the amount of the vertical shearing strain at the joint from one side of (spliced) web joint to the other side of joint. In the flange, however, it is more troublesome.

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In heavy girders, however, (the only one usually, where it is necessary or where it pays to splice the flange plates), it is best to carry the upper or outside layers of flange plates a longer distance from the centre (or point of greatest bending-moment) than required by calculation, thus gaining extra material in the flange, and more than required there by calculation, and then using this extra material to offset the loss suffered by making the additional rivet holes and by cutting or joining one of the flange plates at the point. For instance, Figure 198 represents the side-view of part of the top flange of a plate girder. *A B* is the first flange plate running entire length of girder, *A* being towards end and *B* towards centre.

Flange-splice.

This plate has to be spliced. We have previously found that we can thin down our flange at the points *F*, *E*, *D* and *C*. We will decide to piece plate *A B* between *D* and *E* say at *G*. Of course the flange will thus be weakened at the point *G* by the entire loss of

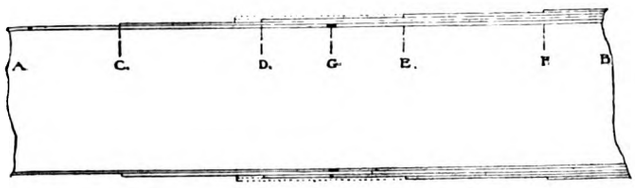


FIG. 198.

plate *A B* and if we attempt to regain this by cover-plates it will lose the additional rivet-holes. But by prolonging the upper plates as shown by dotted lines this loss can be made good and without any additional rivet-holes.

For by the time the plate which originally ended at *E* has been extended to *G* the girder is considerably stronger than needed, that is, stronger by the amount of thickness of this extended plate, and the girder can therefore bear the loss suffered by the cutting of the lower plate. Providing, of course, the plates are of equal thickness. If there are not enough rivets between *G* and *D* to take up the strength of the spliced plate, the plate which ends at *D* will also have to be extended, as shown by dotted lines, till the number of rivets desired have been covered.

In many cases the extending of flange plates is sufficient to form the splice, but frequently an additional cover plate over the extended flange plate may simplify and cheapen the cost. The arrangement in each case will depend upon the number of rivets required, the respective thickness of plates and other local circumstances.

As a rule the angles are made in one piece from end to end, as they can easily be obtained of great length, and are awkward to splice. Angles should be used as heavy as possible, but if very thick they are difficult to straighten, and besides reduce greatly the value of flange rivets, owing to the bending-moment.

Angles in one piece.

In determining the thickness of web it has to have sufficient area of vertical cross-section at all points to resist the vertical cross-shearing, and must be stiff enough not to buckle under its load, which will be equal to the vertical cross-shearing at each point of web.

As this vertical cross-shearing is always greatest at one or both supports, we should have for thickness of web:

Web-thickness.

$$b = \frac{p}{d.\left(\frac{g}{f}\right)} \qquad (124)$$

Where b = the required thickness of web, in inches, (should never be less than $\frac{1}{4}''$ thick).

Where d = the depth of web, in inches, this should be the *net* depth d, that is depth *less* all rivet-holes coming on any vertical section at or near reaction.

Where p = the reaction, in pounds, at either end, (Formulæ 14 to 17). The larger reaction should be used, where they are unequal.

Where $\left(\frac{g}{f}\right)$ = the safe cross-shearing stress of the material, in pounds, per square inch.

If web is not to be of uniform thickness throughout, use, in place of p, the amount of vertical shearing-strain, in pounds, at the point for which thickness of web is being calculated.

In many plate-girders the web will be so thin in comparison to its depth, that there will be serious danger of the web buckling, particularly towards the ends where the vertical cross-shearing (except in case of single concentrated loads) is always greatest.

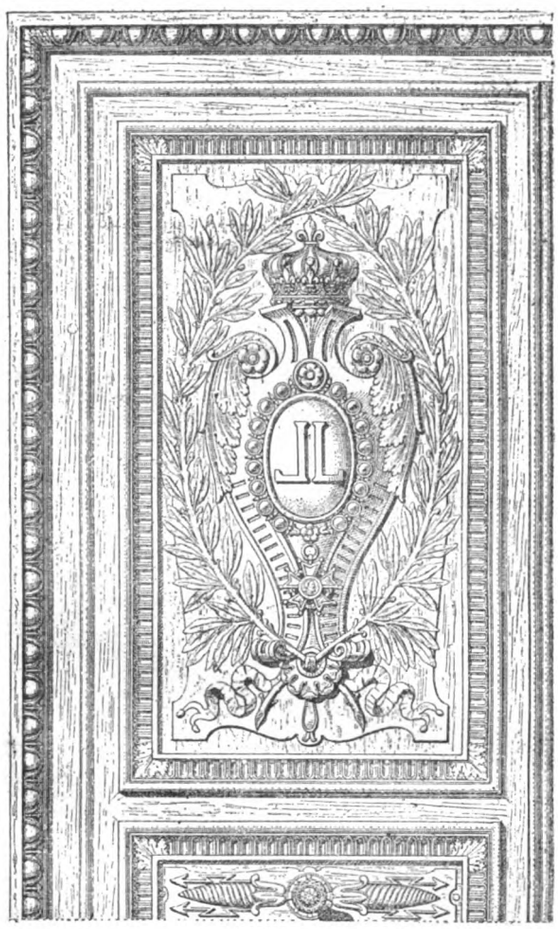
Danger of buckling.

To avoid this danger the web is stiffened by riveting upright angle irons, or T-irons to same, between the flanges. The ends of these stiffeners should *always be planed* and bear truly against each flange.

LOUIS DECOPPET BERG.

[To be continued.]

COLUMBUS AND HIS CONVENT.



Door Panel, Musee des Antiques, Louvre M. Duban, Architect.

IN the Lonja, containing the royal archives of the Indies, in the city of Seville, is a mass of material pertaining to the conquest of the West Indies and Mexico that has never been exploited. Inaccessible to the ordinary tourist, great bundles and packages of letters and documents lie securely intrenched behind glass doors. But, affixed against the walls, at intervals, are certain letters that bear their history on their faces, that are open and can be read by every passer-by. They are well-nigh priceless; unique, at all events, for most of them are from the great *conquistadores* themselves. The first of these, in point of years, is one from Magellanes, dated at Seville, 24th October, 1518.

Another, date 12th October, 1519, is from Diego Velasquez, written from La Isla Fernandina (Cuba) giving notice of the disobedience of Cortez, who had taken possession of the ships and armament Velasquez himself had collected, and sailed away to what (as we now know) resulted in the conquest of Mexico.

Less than three years later, a letter is written by the indomitable Cortez himself to Charles V, announcing his great discoveries and acquisitions. It was written from Coyoacan (near the City of Mexico) 15th May, 1522; one of those veritable *Cartas de Cortes* that have proved so valuable to historians.

Bearing date December 13, 1520, is a letter from Diego Colon, son of Columbus, then in San Domingo, as viceroy.

Another, the same year, addressed to the King, Charles I (Charles V of Germany), is from that fiery-hearted monk, Bartholemew de las Casas. Long before that letter was written had the wrongs of the down-trodden Indians begun to cry for redress, through the good Bishop of Chiapas.

Next in sequence, comes a letter from Juan Ponce de Leon, "Puerto Rico, February 10, 1521." He had then, doubtless, given up his search for the Fountain of Youth, and was preparing for that last venture in which he lost his life. A confirmation of the statement by historians that Francisco Pizarro, the conqueror of Peru, could not write his name, is found here, for the letter purporting to be his bears his *sign-mark*, only.

With date 1526, there is a royal cedula of Charles I; and another from the same king, to Don Louis Colon, in 1537; another, by Philip II, in 1560.

A letter written in July, 1539, from Hernando de Soto, touches Americans, surely, for it comes from the Puerto del Espiritu Santo, coast of Florida. Tampa Bay, it is called now, and De Soto was then disembarking his forces, preparatory to that terrible march through the Floridian wilderness, that ended at the Mississippi and brought him to his grave.

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In 1556, that stout soldier and truthful historian, Bernal Diaz del Castillo, who fought all through the Mexican wars under Cortez, writes a letter to his sovereign. He was then governor of Guatemala, and his letter comes thence, "Guatemala 10 *de Mayo*, 1556."

In these documents we have history epitomized and romance condensed, with suggestions enough to keep an elaborator busy for a lifetime.

But one more name, that of Columbus, is necessary to bring before us the conquest and discoveries of that period so rich in barbaric treasure, so red with Indian blood misspilt:

> "*No hay olla sin tocino*
> *Ni sermon sin Agostino.*"

No *olla* without its pork, no sermon without its saint, says the Spanish proverb. The saint in my sermon, these days, when the near approach of the quadri-centennial lends an interest to everything American and Columbian, is Saint Colon. He, then, is the "pork" in this *olla podrida*, and it was to obtain information regarding his voyages that I visited the Lonja and Columbian Library, at Seville, and later the port of Palos[1] and Convent of La Rabida.

It was the day following my donkey-trip to Palos that, having returned to Moguer for shelter and food, I essayed another little journey in the same direction. A sturdy donkey-boy attended me; not the one-armed, one-idead brute of the day before, and we made the distance merrily, halting at Palos only for a lunch.

The proprietor of the one-armed boy came early that morning to threaten all sorts of vengeance if I did not again hire him and his beast; but I got away in safety, though having some misgivings as to a happy return.

About three miles beyond Palos, passing through scenery unattractive and sad, you sight some clumps of trees, and a hill rises against the sky. Then, slowly climbing, you bring the roofs and cupolas of a lone white building into view, which you find, as you gain the upper slope, pertain to a convent structure of the olden style. It is rambling, yet compactly enclosed within a high wall, and it is extremely picturesque.

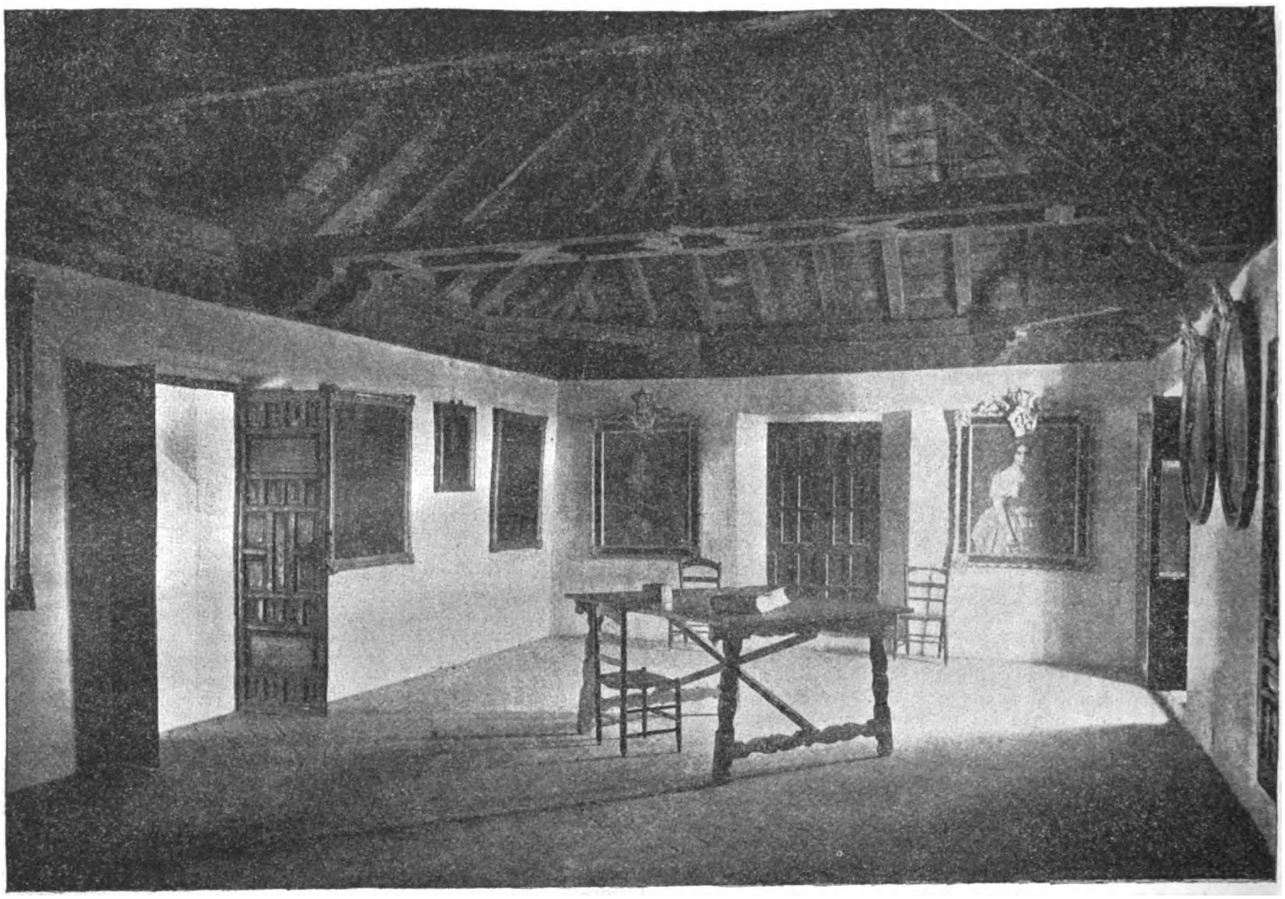
I was very fortunate, later on, in securing a fine photograph of it, as clouds lay massed about it and a flock of sheep slowly grazed before it. And it was thus I found it, this convent of La Rabida, at the gate of which Columbus halted, to beg for water for his son. You know, of course, the story: Columbus, wearied with waiting on the Spanish court, where he had dangled attendant for years, at last set out for Portugal, taking with him his little son.

How he came to such a secluded spot as La Rabida, no one has explained. But he probably made for the coast of Spain, thinking, perhaps, to obtain a vessel at Huelva, then, as now, a shipping-port for copper ore to foreign parts. Indeed, this very spot is the ancient Tarshish of the Bible, and the Phœnicians came here, more than two thousand years ago; those men of Tyre, who discovered the passage between the Pillars of Hercules.

But, Columbus came here, halted at the gate (the arched entrance at the right) and craved refreshment, in the name of God. The prior of the convent, the good Prior Marchena, chanced to see him, and to enter into conversation with him.

Struck by his dignified appearance, and also by his evident learning, the prior invited him to tarry a while, and soon he had his visitor's story: of long-deferred plans, of wearisome waiting and of heart-crushing defeat.

Prior Marchena, it so chanced, had been confessor to Isabella, before retiring to this convent, and, as he became impressed with the stranger's story, his heart was fired with zeal, and he resolved to make the cause of Columbus his own. That very night, the historians tell us, he caused his mule to be saddled and started for Granada. At midnight, he left the convent, pursuing the same weary road, through Palos and Moguer, that I have traversed (only he was not favored by steam or stage) to Granada, perhaps two hundred miles away.



The "Columbus Room."

Meanwhile, Columbus waited, resting in the cool corridors, walking meditatively along the shore, and gazing wistfully out upon the sea, from the arched and sheltered *mirador*.

The convent, to-day, is in excellent preservation, having been carefully restored and placed in the care of a faithful old soldier. I found the family in possession so simple and kindly-disposed, that I craved permission to pass the day and night there, which they readily granted. So, paying my *mulero* double wages, and sending him back to Moguer with a kind message for the friendly landlord, I was soon placed in possession of the convent, isolate from all the world. Not Fray Perez himself could have possessed it more completely. I wandered at will through its corridors, its cloisters and vacant refectory. I rambled over the hills, back and beyond the convent, covered with thorn-bushes, artemisia and stunted pines, and indulged in solitary revery to my heart's content.

Climbing the winding stairway to the *mirador*, I had before me broad vistas, through the arched openings, of the river and the sea. Directly beneath, the hill sloped rapidly to the half-submerged lands of the river and the sound. Half-way down its slope is a date-palm, said to date from the time of Columbus; perhaps equally old are a gnarled and twisted fig-tree and two gray-green olives that keep it company. Across the lowlands, a dry roadway extends to

[1] *American Architect*, Nov. 16, 1889.

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the deserted mole, whence one may embark for Huelva, or for other ports farther along the coast. Extending southward, even to the mouth of the Guadalquivir, are the Arenas Gordas, the great sands, that make this coast a solitary waste. Truly, it is a lonesome spot, this upon which the convent is perched, and the soul of Columbus must have been aweary as he drew near the convent-portal.

The Domingo Rubio, a sluggish stream tributary to the Tinto, separates from Rabida a sandy island, where there is an ancient watch-tower (mentioned by Irving) and a camp of *carabineros* on the watch for *contrabandistas*. A little to the west, the Domingo Rubio meets with and is lost in the Rio Tinto, and the two join with the Odiel and flow tranquilly on to the ocean, where the foaming breakers roar with a sound that reaches even to La Rabida.

Beyond their united waters, again, is another sandy island, and another distant watch-tower, till the low coast fades away in the distance.

Down this channel sailed, or floated, Columbus, bringing his boats from Palos, on his way to the sea. The landscape is of a dreary kind, flat, with distant woods, and farther a hint of purple hills. Opposite, across the broad bay, reposes Huelva, where great steamers can be seen lying at its long mole, taking in copper ore for England. It lies like a snow-drift, white, upon a tongue of land, between copper-colored hills and the sea. It is a sad landscape — *muy triste* — yet a bright sun, in its setting, might make it transiently glorious.

The old soldier in charge of the convent, Don Cristobal Garcia, the "*concerge*," was evidently in very straitened circumstances, yet he was cheerful, and his hospitality shone forth resplendently.

He laughingly informed me that he rejoiced in the same name as Columbus: Cristobal; but, he added, he had never done anything to make it illustrious. He and his family lived in a primitive, even pitiful state. At meal-times they gathered around a common platter, set upon a table some two feet square. But my own meals they served me upon snowy linen, at a table apart.

There were six of them: the old man, his wife; Isabel, a little girl twelve years old, and three boys. One of the little boys was very bright, learning readily some English words, pronouncing them with that delightful accent of the Castilian. Isabel, poor child, pattered about the stone pavement with bare feet, but they were pretty feet, and her little brown ankles neatly turned.

Another member of the family, evidently an intruder, I had forgotten to mention: a little chap clad solely in a short shirt, who had squint eyes, and a great shock of bristly black hair, Don Cristobal told me that he was a descendant of one of the Indians Columbus brought to Spain from America, on his return from the first voyage. This he told me with a serious countenance, and as the child's face was certainly that of an Indian, I am more than half inclined to believe the story.

The little people were delighted with the peeps I gave them through my camera, and capered about with delight at the sight of the court and its flowers spread out before them in miniature, and nearly jumped out of their skins at a view of the grave old *concerge* standing on his head. "*Mira! Mira!*" they exclaimed, and gazed at me with awe and wonder.

They gave me a good bed in one of the cloister-cells; the very one Columbus slept in, Cristobal assured me, and I slept well through the night. I was disappointed that I did not dream, and receive a visitation from some steel-clad hidalgo, or from a girdled monk or two. But, of dreams I had none worth preserving, and at six in the morning I was awakened by the good *concerge*, who inquired if Don Federico would not taste a little *aguardiente*. Don Federico would, and well he did, for it was three or four hours before he received a hint of breakfast. The poverty of my hosts was apparent when they dispatched the oldest boy to Palos for twenty cents' worth of meat and two eggs. While he was away I went with the old man into the *huerta*, an enclosed garden, where he had planted "*alva*," peas, vines, maize, pear and fig trees. As it rained, I sheltered myself in a grove of slender pines and watched my good friend toiling at his vines. The rain fell in torrents, and the boy sent to Palos did not return till half-past ten. Then we had breakfast, the others waiting till I had done. There were the two eggs, which the mistress could not have regarded more proudly had they been golden, for they were very scarce, eggs were, at Palos, and it was waiting on a hen's pleasure that caused the boy's delay. He had been told to bring back two eggs, and if that hen hadn't have happened along I might have been awaiting that boy's return at this day.

And *carne* — meat, *pan* — bread — and golden wine. That wine! The product of Don Cristobal's own vineyard, true *vino de Palos*, sweet, yet sparkling. The rain outside had made the convent cold and cheerless, so a fire was built in the fireplace of the ancient monks, and, as it crackled and leaped up the huge chimney-throat, we were warmed to our very hearts. The old soldier told me bits of his past history and legends of the place, while the chubby children gathered round, chins on their hands, stretched before the fire like kittens, regarding us with wide-open, wondering eyes. I said we had meat; it was not flesh of lamb or sheep, but of goat. It was old and it was tough. Don Cristobal remarked my desperate efforts to carve it, and observed that the market of Palos was never supplied with other than goat-meat, and that, he doubted not, it was very old.

Now, Don Cristobal had a way of ascribing everything ancient to the time of Columbus.

"Is this old?" I would inquire.

"*Si, Señor, es tiempo de Colon.*" "Yes sir, surely, of the time of Columbus."

So I said, pointing to the goat-meat: "This is very old?" "*Es muy viejo, no es verdad?*"

"*Si, señor, me parece muy viejo.*"

"*Muy viejo?*"

"*Si, señor.*"

"*Tiempo de Colon?*"

The old man was slow at digesting this at first, but when he did he nearly exploded with laughter, and hobbled outside to tell the Americano's joke to some old cronies who were sunning themselves at the door.

By this time the rain had ceased, and the sun was struggling fiercely with the clouds. We ate our meals in the corridor, which ran around a court, or *patio*, open to the sky. This court was filled with flowers, vines crept up the pillars, figs and oranges had possessed themselves of space enough for luxuriant growth, and it was indeed an attractive spot. From this court opened out many cloisters, but there was another, farther in, where the chamber-cells of the monks were very numerous. Vacant now, with doors ajar, and no one there to inhale the fragrance of oranges and roses luxuriating in this inner court. Off at one side was the chapel where, it is said, Columbus knelt in prayer, and on the opposite side a passage led to the refectory, where the stone benches on which the good monks sat are seen to-day, empty and chill. Climbing a narrow stairway, you come to a corner-room looking out over the Rio Tinto — a large, square room, with floor of earthern tiles and ceiling of cedar, with carved beams, rich and dark.

This is the "Columbus Room," where the great admiral, the prior and the learned doctor had their famous consultation, which resulted in their embracing the cause of Columbus and in the monk's intercession with Isabella. Many a painting has represented this historic scene, perhaps none more faithfully than the one hung in the room itself. An immense table, old, but sturdy still, and around which the great men are said to have gathered, occupies the centre of the room, and on it is a *tintero*, or inkstand, said to have once belonged to Columbus himself. Around the walls are hung several excellent pictures. First, a grand painting representing the discovery of land by Columbus; also five others, painted in Seville. One of the best shows Columbus at the convent-gate; another, the consultation between the sailor, the monk and the doctor; the embarkation at Palos; the final departure from La Rabida; the publication of the king's commands in the Church of San George, at Palos; portraits of Colon, of Juan Perez the monk, of Isabella the Catholic, of the last Isabella and the Duke and Duchess of Montpensier. These last, sister and brother-in-law to the late queen, Isabella, are said to have taken a great interest in the preservation of the convent and its contents.

I had often thought that to be a monk, cloistered in cool corridors, would be an ambition it were well to gratify, and I must confess to a feeling of pity for the poor *frailes* who were turned loose from these quiet retreats and set adrift upon an unfeeling world.

I wonder if they enjoyed as I did the seclusion of the place, and the sunset view from the *mirador?* In pleasant weather, when the hot sun shines, this *mirador* must be supremely attractive to one sitting in the shade and looking forth upon the sea. Drowsy insects hum outside, the half-suppressed sounds of maritime life float in on the breeze, and lively swallows fly in and out, twittering to one another as they seek their nests. Ah! pleasant *mirador*, overlooking the historic river and the sea; soon I must leave it, for a *mystick* is lading in the Rubio which offers the sole conveyance to Huelva for the day. Even as I write, I see Don Cristobal going down the hill to engage passage for me in the *mystick*, the sand-sloop, lying at the river-bank. Down the stream beyond the Tinto, glide lateen sails, toward the bar which Columbus crossed in 1492.

Don Cristobal returned with the information that the *barquero* on the sands would sail within the hour. Paying him for his trouble (though it was a small sum he demanded), I took leave of Señora and the children and followed him to the mole, where a *carabinero* rowed me across the inlet. Once there, I found that Don Cristobal was mistaken, and that the *mystick* would not leave till night. The men at work lading her insisted that I should take a drink of wine with them, and so I stayed awhile and chatted cheerfully.

It was near this very spot, on the banks of the Domingo Rubio, that Columbus careened his vessels and took aboard his final cargo, just before setting sail on his eventful voyage. Somewhere near the mole itself he took his final farewell of the good prior, the last, best friend he had in Spain.

These thoughts filled my mind as I chatted with the men on the *barquero*, but not a thought had they of Colon, or of anything, indeed, beyond their sand. The sand was for ballast, and they would take it to Huelva and sell it for a trifle at the rising of the tide.

If I would wait, I was welcome to a passage; but they thought that, by cutting across the sands, I could hail a fisherman in the main channel as he came in from the sea. The *carabinero* thought likewise, and guided me to the ancient tower, where two of his companions took me in a small boat to mid-channel, where I had the good luck to catch a fisherman bound for Huelva. He took me willingly, and we sailed away, with a spanking breeze behind us. Two men and a boy comprised the crew, and three immense fish the cargo. Half-an-hour of sailing, and we drew near the great mole

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at Huelva, where large steamers lay loading for France and England. As we neared the quay, a boy drove down a mule-cart into the water, backed it up to the boat, and we were all loaded into it, fish and men.

On shore, a little urchin with wide-extended mouth seized upon my camera and gripsack and led the way to the railway station. I was forty minutes ahead of time, but that was nothing; the train was in waiting, and I bought my ticket and got on board.

I spent those forty minutes gazing wistfully at Palos and La Rabida, the latter shining like silver against a bank of clouds. Palos, also, and Moguer gleamed white against the hills. Two leagues away lay the sea, and I had just ploughed the channel Columbus followed with his *caravels* in 1492.

Sad and solitary convent, poor and lonely Palos, ye both have survived your time, and nevermore will ye witness great deeds done! Nevermore will joyous crews here bring *caravels* to port from distant strands!

Of all my little journeys in Spain, this one to Palos touches tenderest chords; and I left the scene behind me with regret.

Frederick A. Ober.

THE EXHIBITION OF THE BOSTON ARCHITECTURAL CLUB.

"All the Modern Improvements."— No. 10.

The Boston Architectural Club has spent a great deal of time, and no small amount of money, in getting together what is certainly the best collection of architectural drawings ever shown in this country. The New York League exhibitions have surpassed it in the interest of what may be called the accessory attractions, such as the displays of bric-à-brac and furniture, and, of course, the drawings shown by the Boston Club are no better than the best shown by the League; but the League exhibitions admit some very poor work, both in design and drawing, which attracts the critical eye at once, and reduces the average effect below that which has been obtained in Boston by a rigid selection from the works offered.

The Boston Club has hit upon, or, more probably, has fallen into, a peculiar method of announcing its entertainment to the public. It seems that one of the "side-shows" of the affair is a group of clocks with "patent chimes," consisting of metallic cylinders; and a set of the chiming cylinders, of immense size, is placed on the balcony outside the exhibition hall, and is played at intervals by a robust person, whose hymns and patriotic melodies are audible for about half a mile, and collect a crowd in front of the building. Whether the innovation deserves to be followed in future is doubtful. Even if the chiming cylinders were in perfect tune, it is a little embarrassing to modest professional men to force their way to the exhibition rooms through a wondering crowd, with "God Save the Queen" resounding over their heads; and in the hall, where most people wish either to talk, or at least, to think, the noise is a positive nuisance.

Barring this, however, the exhibition is very attractively managed and arranged. Entering the main room, we find the place of honor occupied by a fine water-color drawing of the new Boston Courthouse, by Mr. T. O. Langerfeldt. Beneath this is one of the French competing designs for the Prix de Reconnaissance, instituted in the Ecole des Beaux-Arts by former American pupils of the School. The drawing is marked, "Second Mention," but, although interesting from its subject, and cleverly rendered in the French manner, it is thin and unstudied, and is surpassed, both in design and rendering, by several of the designs shown by students in American schools of architecture. On the right of these drawings are shown, as if to prove what Americans can do, when they try, what seem to us the most beautiful drawings in the whole collection. Both are "envois," from the Rotch Travelling-scholar of 1889, Mr. Henry Bacon. One is an elevation of the court-yard front of the Hotel Cluny in Paris, fully rendered in water-color, and the other is a line-drawing, in pen-and-ink, of the monument of the Margrave Hugo, in the Badia at Florence, by Mino da Fiesole. Both are measured drawings, and for effective delicacy and precision of hand they are unequalled by anything else, either American or foreign, in the exhibition.

On the right and left of the alcove containing these conspicuous examples of how much credit a Rotch Scholar may do himself and his profession hang four of the designs made by the competitors for the Rotch Scholarship of 1890. Two of these, by "Sans Souci" and "Fleur-de-Lis," show excellent plans, well studied and well rendered. The elevations are not so good, the time allowed being, perhaps, rather short for developing with complete success a design on a theme so extremely difficult as a five-story hotel; but both are accompanied by very clever and skilful sketch perspectives. The two sets of drawings on the opposite side show much less successful planning, but the elevations are tolerable, and the perspectives also very good. It is evident enough, in fact, from all recent exhibitions, that perspective sketching in pen-and-ink is the strongest point of American draughtsmen, and they might with advantage afford now to devote a little more time to improving themselves in planning, and to designing and modelling detail, in which we are still wofully deficient, as compared with the French, or English or German architects. We will not mention any names, especially as we are all sinners together; but no one can look at the beautiful sketches made by American architects of foreign detail, and then at the drawings or photographs of the idiotic, sprawling, spiky "Romanesque" sculpture with which the same architects allow their buildings to be disfigured, without wondering how long it will be before architectural sculpture in America will be, as it is elsewhere, the work of the architect instead of the stone-cutter. It is not always the stone-cutter, either, who deforms our buildings with his crude, unfeeling devices. There is a drawing shown, of what purports to be a "decoration" for a church, which consists entirely in a mass of incoherent convolutions, mingled with spikes, and conveying as much idea of beauty or intelligent design, as would be afforded by a group of earthworms, squirming in a measure of oats. Such work is simply sickening. If architects cannot take the trouble to invent something pretty to put on their buildings, they can at least copy good examples; or, if they cannot find appropriate ones, they can leave the building unadorned.

Near this end of the room is a group of measured drawings from Coutances Cathedral, by Mr. A. S. F. Kirby, of Boston, carefully done on a large scale. We are very glad to see, year by year, an increasing number of measured drawings, done by our architects in their vacation travels. However fascinating it may be to make clever sketches, the solid work of measuring and drawing to scale is much more useful to the student in the end, and we shall never advance far in an art until the practice becomes general. Beyond the Coutances drawings is an alcove of photographs of interesting work. The most strikingly good of these is a beautiful bromide print of Messrs. Cabot, Everett & Mead's Hastings Hall, at Cambridge. The building itself is simple and charming, and the photograph, which appears to be a solar enlargement from a small negative, is so soft and full of half-tint as to look more like a beautifully-finished India-ink sketch than a photograph. Near these is a very interesting set of photographs of rooms in Colonel North's magnificent mansion at Avery Hill, by Mr. Thomas W. Cutler, F. R. I. B. A., besides more modest interiors of American houses. Among the latter we notice a rather questionable innovation, in the shape of photographs highly colored after nature. The effect is, in most cases, staring and disagreeable. It should never be forgotten that in photographs made by the usual processes the shadows are far darker, in proportion to the lights, than in nature, and, while we can forgive the want of roundness in the print of one color, for the sake of the brilliancy which the exaggerated contrast gives, the addition of other colors gives a staring and unnatural look, unless the photograph is made very faint, for the purpose of coloring.

Besides the English photographs, a very fine collection of the best English architectural drawings is shown, in pen-and-ink, sepia and water-color. A large part of them are by Mr. Raffles Davison, and are well-known to our readers by the reproductions in the *British Architect;* but there are some very beautiful water-color drawings by Alfred Waterhouse, R. Phené Spiers and others, and one or two most lovely drawings in sepia by Ernest George. It will be remembered that Ernest George won distinction as an artist and etcher before he was heard of as an architect, and his charming work as an architect becomes still more attractive when shown by his skilful and loving hand.

We have said a good deal about the smallest part of the exhibition, and very little about the largest part, the collection of work by contemporary American architects; but it is hard to know where to begin treating of that subject, and where to leave off. One thing, however, struck us: that nearly all the architects who pretend to draw at all showed something very good, and most of them, also, something not so good; but those who have exhibited before have generally sent something new of their best work, and many who have not been known as exhibitors have shown extremely creditable designs and drawings. As to the furniture show, which is in the lower hall, we can find nothing better to say of it than that it is languidly interesting, containing some good rugs, tapestries, furniture, hardware and gas-fixtures, but nothing, so far as we could see, of extreme artistic value.

The Proposed Simplon Tunnel. — The Simplon tunnel seems likely to be the next important engineering achievement on the Continent. As Italy disproved of the former plans, which in her opinion gave France too great an advantage, an entirely fresh scheme is now proposed, comprising a tunnel some eighteen miles long, of which eight would be in Italian territory. In this case, however, the Italian Government must grant a subsidy of 600,000 pounds sterling. — *Louisville Courier-Journal.*

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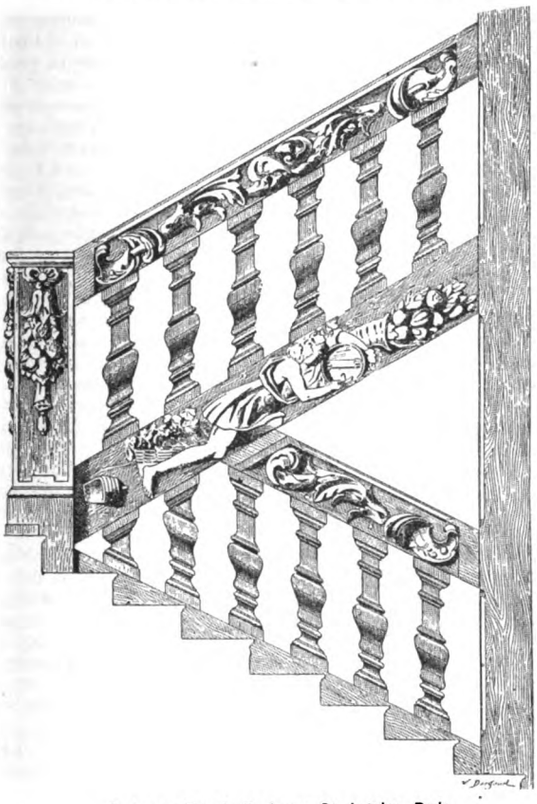
ENGRAVING IN WOOD; OLD AND NEW.[1]

CONCERNING THE USE OF LINES IN ENGRAVING.



Staircase, Rue du Faubourg-St. Antoine, Paris.

MY argument is concerning the use of lines in line engraving. Of what use and of what value are lines in engravings which are altogether done in lines?

I confine myself to my own art, engraving in wood; but my argument may be also applicable to engraving in steel or copper, and not without interest as regards art in general. To show the use and value of lines in a line engraving may at first appear unnecessary, but indeed there are engravers and critics who seem to require some teaching.

Not certainly the inventors of line engraving, but the beginners of the art of line engraving in wood, were Thomas Bewick and Robert Branston. Branston died in 1827, Bewick died a year later, in which year I was apprenticed to Bonner, a nephew and a pupil of Branston. Better engravers than even Bewick himself were two of his pupils, Nesbit and the painter Clennell. And Branston's greatest pupil, John Thompson, we have always recognized as the master of our art. These are the old engravers of whose work I have to speak. Passing over my own period of half a century, it is their work which I would compare, or contrast, with what has been called a new departure, recent work in America, coming into fashion also here. I do this in the interest of art generally, especially in the interest of my own branch of art, engraving on wood. I am sorry that I can bring only statement and argument to bear upon the question, as it is impossible to exhibit specimens showing the differences of old and new. I can only endeavor by description to make the matter clear to you.

I mean to speak of the old work, that of the men I have named (named as representatives) as good work; of the new work (notably American) as bad. Good or bad in this: the old work was characterized by the expressiveness and beauty of its lines; the new work is remarkable for the absence and neglect of beauty or expression.

Bewick's line was not always good; but you cannot look at an engraving by Clennell or Thompson without seeing at once that the engraver was an artist. Forgive so broad an assertion. There are eyes which cannot see, and not a few professed critics are really purblind, some sightless. Let me say only that any one qualified to judge of an engraving would not fail to see in the work of Clennell or Thompson that the engraver was an artist; that is to say, that he had knowledge and purpose in his work, that he used his brain as well as his hand, that every touch or line of his graver was governed by thought, was as purposeful and sure as if he had drawn it with a pencil; that he did indeed draw it with a graver. I want you to understand this as the primary essential, the one necessary qualification of good engraving; this as absolutely required, that the engraver in every line — aye! in every line — shall have forethought and intention, and (making allowance for some inefficiency in all men) that he shall do what he intended. I think this holds good in all art, whether the graver, the pencil, or the brush be the instrument in the artist's hand. On this principle the old men worked. They had some inkling of what may perhaps be asserted without fear of cavil, that a work of art should be artistic throughout. As their work had to be done in lines, they perceived that it might be worth while to consider with what lines, so finding that some lines were fit for certain purposes or for parts of an engraving, and some not fit, so reaching at last to a preference of beautiful and harmonious lines and the avoidance of lines ugly and offensive. And this seems to me the singular ground upon which all good line engraving in wood or copper has been and must be based. So based, I find in the engraving of the old time to which I refer, that the lines were well considered, showing that the engraver always deemed them of importance. Differences of line there were; white line characterised the Bewick school. What may be called the drawing of the subject — bird, landscape, figures — was rendered by white lines, the graver incisions in the wood, the black surface of the block from which the print was taken being as it were a blackboard on which the picture was by the graver expressed and drawn in white. Thompson's work rather imitated copper, he — if a broad distinction had to be made — thinking and caring more for the black lines he left on the surface than for the lines he cut, but caring for both.

There, I take it, is the peculiar excellence of that old-time work; the full understanding that a good line engraving is the representation of a picture — a portrait, a landscape, or anything else — by beautiful lines, lines chosen and well adapted to give the forms, the lights and shadows, the perspectives, and in some cases the very substances, of the picture represented. I regret that I cannot show you examples in proof; you must seek them for yourselves in such books as you can get opportunity to examine. You need such examination to enable you to understand what good engraving is.

Do not make the common mistake of supposing an engraving must be good because you like the subject and find the general effect to your mind. If you would know what engraving is, you must judge of it quite independently of the subject or the designer. You may be satisfied with the picture before you in this month's magazine and not care anything about the technical excellence of the engraving. If so I have nothing to say to you except this — Do not talk about it as an engraving!

I gather this from my experience as an engraver: that certain lines are more fit than others, consequently that a consideration of fitness is of importance. A rough line will better represent a rough surface; delicate contours should be modelled by smooth and flowing lines. Also there is a perspective in the use of lines. And I dare to assert as beyond controversy that fitness and beauty are requisites of art. I know that all forms, all rules, have a tendency to become only formal, conventional; but that is no reason for not considering and determining their worth; and conventionalism may not be best avoided by merely running away from it. I am not insisting upon certain set lines, nor indeed on any lines at all. I can be content without lines. I admire mezzotint and aquatint, and also some new photogravures of a similar character. Only, when we must have lines let them be good lines! (As an artist, can I demand less?) good lines, well considered, fit, expressive, and (may I not add?) pleasant to look at; lines that will tempt a second glance, lines to satisfy the learned lover of engraving as a distinct art, lines such as I find in the works of my old wood-engravers, such as I find also in the best works in copper, such works as those of Sebald Beham of old time, and Milton and Sharp (landscape and portraiture) of a later period.

Coming now to the new style of engraving, I quarrel with it for its want of art. The engravers, being only line-engravers, do not appear to know or to care anything about lines. They neglect the study of line, and show an utter indifference to line-values. Take the two most notable magazines which brought into vogue this now much-admired and much-praised kind of work, admired by an ignorant public and praised by professed critics, who ought to know better: I refer to the *Century* and *Harper* for my examples. I dare to say that, with few occasional exceptions, there is no art in them. Generally clever and pleasing pictures, well-designed, effective and nearly as good as photographs. Pure photographs, if to be had, would, however, well replace them, and we should then escape the infliction of linear ugliness, and be no longer annoyed and insulted with the pretence of engraving. Do I judge these pseudo-engravings too severely? Once you may look at them, and, not noticing the lines, be satisfied with the general effect; but will any intelligent person look at them a second time to admire the engraver's workmanship? I do not deny their cleverness even as engraving, but the cleverness, the very great cleverness, is only mechanical; there is no art in it. There is no artistic taste nor judgment in the employment of lines; there is no expression in a single line. Colors may be kept; but form is lost; distances are mixed and confused; substances are unnoticed; the combinations of line are ugly and offensive. I speak without the works before me in proof, but they are in every one's hands. Think of what I say when you look at your next number. Try if you can discover, except in the portraits (strangely engraved by the same men with real regard for fitness and beauty of line) — try if you can discover any lines that have beauty or expression, or giving any sign of intelligence. There is wonderful delicacy; that is, delicacy of tone, fineness, thinness of line; the often useless, sometimes most unhappy, minuteness is astonishing. I have been surprised at these accomplishments, exceeding

[1] A paper read before the Society of Arts, London, March 25, 1890, by W. J. Linton, and published in the Journal of the Society.

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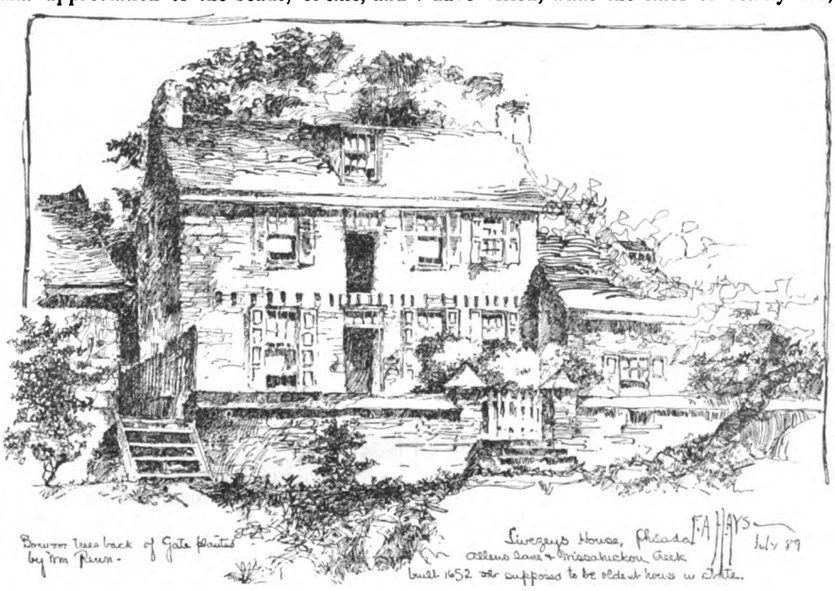
sometimes anything I have thought possible in wood-engraving. It is the triumphant assertion of mechanical skill. What eyes these men must have! What nicety of hand! But then — I am speaking as an engraver — in the prettiest and most successful of these engravings I seek in vain for evidence that the engraver had any brains, that he could have known or understood the forms he was engraving, that he had any thought of perspective, any perception of differences of substance. In nearly all these cuts foreground objects are on the same plane as those in the background; there is neither air nor distance; sky may be wall, and water may be folds of drapery, for any distinction of linear treatment; and the lines throughout are laid with utter disregard of the things supposed to be represented by them, in seeming ignorance or wilful rejection of all the laws of linear beauty and perspective recognized and cared for by the masters of engraving both in wood and copper. Horizontal lines of a sky are crossed perpendicularly; the rough bark of a tree, a woman's delicate cheek or bosom, a sheep's woolly back, have no distinction of line to denote difference of substance; foreground and extremest distances are cut with the same unvarying fineness; all things stick together, all things are undefined, muddled, confused. Color and tone may be excellently kept, and the first impression, not noticing the lines, taking the picture only as a clever and tolerably fair imitation of a photograph, may strike one pleasantly; but returning to it, examining it, there will be no satisfaction. It will never give the enduring pleasure of a beautiful engraving. Forgetting the lines altogether, it may be possible to like it, but one will not care to look at it again and again. The more closely it is examined, the greater will be the disappointment. Does not that of itself condemn it?

And yet in these same magazines are heads engraved by the same men, engraved with singular appreciation of the beauty of line, and with close attention to that, portraits which, by their juxtaposition, only make the unredeemed ugliness of figures and landscape the more conspicuous. I can hardly overpraise some of these heads. The drawing is firm and definite, the modelling is good, the flesh does not want for fleshiness, the lines are laid harmoniously, so that in themselves they are a delight to see. Why should this be thought necessary or worth doing in a portrait, and yet be altogether neglected or despised in everything else? I cannot answer why; but I know that the attention in one case rebukes the inattention in the other.


Sweetbrier Tree back of Gate planted by Wm Penn.
Swedes House, Philada
Salem Road + Massahickon Creek
built 1652 or supposed to be oldest house in State.
FA Hays
July 87

The laws of line in engraving are not merely the pedantry of the schools. They have arisen out of the very nature of art, and are as absolute and incontrovertible as any other of artistic principles. That every drawn or engraved line should be beautiful is involved in the assertion that art is the expression of beauty. Good work is thorough. To say that a picture should be beautiful is but to say that it should be beautifully done. And, however unaware we may be of the origin of those beautiful fitnesses of line which characterize the works of the greatest engravers, however conventional and arbitrary they may appear, nay, however tiresomely-mannered they may sometimes become in the formality of inferior practitioners, they are yet rules for our guidance, which we cannot neglect or violate with impunity. Haste may excuse departure from them, as in the slighter studies of the great painters we see shadow-lines put in merely as memoranda, scribbled in without heed or need of better forming. If the engraver, on whom I am desirous of impressing this law of form, will for himself attempt not a hasty sketch, but a careful drawing, such as I will now suggest to him, he will, I think, better understand the matter. Let him draw a hand, a finger, or only the end of a finger-bone; let him draw it with lines only, fine lines, but quickly and freely, without scumbling. The first line he draws (or I am much mistaken) will be a circular line, some indication of the round outer form of the bone. Not perfectly accurate in his first line, he will correct it with other lines, also circular. As he goes on shadowing and perfecting his drawing, he will observe that, without intention, the general direction of his lines has always had relation to the forms of the bone. In other trials, he will find that he can express forms, convexity or concavity, absolutely by direction of lines, and without color. The law here asserted rules everything. In a face or in a tree, in a cloud or in mountain character, the same law obtains.

Color alone (I mean mere light and shadow) can also represent form, but, if that color has to be got by lines, the law of line comes in absolutely. I do not mean to depreciate the value of tone or of delicacy where wanted. I only contend against exclusive attention to color and tone, and insist that, when you must use lines, those lines shall have meaning. An engraving in wood is producible only by lines, and you cannot by any excess of fineness get rid of the lines. Is it not well, therefore, that what must be seen should be good, or, say, at least agreeable? Is it not clear that, as all your work is done in lines, the more these lines express or indicate, the more complete and satisfactory will be your work? Shall they not, even by their direction, rather explain, or help to explain, the shape or substance you have to represent with them than distort or hide it? In the photographic imitations in the *Century* and *Harper*, and elsewhere, all thought of the values of line is abandoned. Whatever the value of color, of tone, of fineness, does that necessitate an absolute disuse of line? Disuse, for in the cuts I condemn line is not used; it is only put up with; its real use is avoided. It may be that this is wilful. There may be engravers who prefer to have no differential intelligence in their lines. I would still ask them to care a little for some pleasantness of beauty, confessing, however, that I have not much hope of beauty without intelligence.

What is beauty as regards line? To point to examples may be better than to attempt any accurate definition in precise words. Look at free tree-growth, the natural, untrained interlacing of the boughs and twigs; examine a bird's wing, noting not only the outer form and inner central line of each feather, but also the arrangement of lines throughout; remark that same beautiful line of the feather and the wing, the line ever departing from the confinement of the mere circle in all mountain form. Watch the play and change of line in the stirred sea-waves, or, at your own hearths, observe the varying forms of flame. You will then see, if your eyes have vision, what the lines of beauty are, and learn something of those underlying principles on which, consciously or unconsciously, the lines of great artists have been founded.

I have referred to engravings in copper as examples of line. But it is in the white, the incised line of the wood engraver, that his process is identified with that in copper. White line in wood takes the place of black line in copper. I think that even our great engraver, John Thompson, for all his mastery of line, lost sight of the true principle of work in wood when he departed from the white line of Bewick. In that direction only are we able to show the full capability of wood engraving, in that only can we fully earn the distinctive name of artists.

But the engraver's lines, those recommended for study, are so conventional. The very language of art is conventional. Are we, therefore, to be content with the mere ejaculations (not to be called speech) of the careless impressionist? Grammar is conventional, based, however, on certain laws of language, studied, and to some extent known, if not always absolutely determined. The laws of poetry are conventional. Men may eccentrically escape from them, but it is not given to every one to invent a new rythmic system; and so, though I or any other engraver may be free to try any experiments in line, it may not be certain, it is not perhaps likely, that we shall altogether supersede the collective results of the many quite as clever experimenters whose rules (I will not say laws) have been codified for our following. The traditions of earlier time, the records of others' opinions have some worth in them, whatever the acknowledged right of individual judgment. It is not by ignoring the past that the world progresses. But the question here is not of conventionality, but whether, in a line engraving, lines are worth consideration at all.

Let me make one brief remark on the misuse of certain words relating to engraving, "fineness" and "finish." They are anything but synonymous. Fineness, meaning only closeness and littleness of line, indicates no advance in art. The true artist will not employ two lines when one line will serve his purpose as well, or better. Nor will he for any consideration consent to unmeaning lines. It is altogether a mistake to suppose that a work cannot be too fine, fine sometimes meaning finical. There is such a thing as propriety, suitability not only to size but to subject, in the treatment of an engraving. A work may be bold, yet quite fine enough for its purpose. Also it may be finished and refined however bold, in which case to call it coarse, simply because the lines may be large and wide apart would be only a misuse of words. Fineness

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(meaning minuteness), as an artist's word, is not the same as in the proverb, "Fine feathers make fine birds." "Fine" (minute) lines will not make a "fine" (that is a good) engraving. An engraving is fine (meaning good) only so far as art, as distinguished from mechanism, is employed upon it and is visible in the result, visible I would say further to the uneducated if not already vitiated by the words of misleading critics. The art of an engraving is discoverable, even by the uninitiated, in the intention of the lines. You may not have an artist's quickness of perception, nor his mature judgment; but if you see an engraving in which the parts, any of them taken separately, are unintelligible, you will rightly conclude that the engraver did not know what he was doing or how to do it. Do not believe that such a work is a fine work, however close the lines may be together. Art is an intelligent power, designing always. If you can find no proof of that, reject the work as bad.

Every line should be chosen and expressive. When I look at an engraving of a head, and find that the flesh is not distinguishable from the hair; that part of a smooth cheek might be a piece of cloth, engraved in precisely the same line as the cloth in the same engraving (an engraving large enough to admit varieties of texture); when I find face and hair, and what should be aërial background, all of the same substance; when I find an eye formless, a nose of wood or plaster, shapes and contours everywhere undefined and confused, I can but say — despite the admiration of my friend the art critic, and my own general acknowledgment at first sight of much effectiveness, I can but say — "The engraver of this has not learned to engrave, or having learned, has been disloyal to his art; I must condemn the engraving."

Or when I see a landscape, very excellent in light and shadow, in effect and in tone, or, even more, most carefully preservative of the very brush marks of the original painting; but in which also the sky is as woolly as a sheep's back, and the sheep cut with the same line as the water, and the water with the same line as the grass; what must be my judgment of this as an engraving? An engraving in wood is always a picture represented by lines. Shall I call a picture represented by inappropriate, uncertain, inexpressive lines a fine engraving? The lines are very close together. If there is no beauty in them even only as lines, shall I call that ugly engraving beautiful? As an engraver, I can only condemn it for inefficiency.

Granted, that to know a good engraving from a bad one requires some education, some few hints may be of service. To begin, do not be beguiled by the first look and appearance of the woodcut before you. Your premature satisfaction may be partly owing to the pleasantness of subject or else to the cunning of the draughtsman who knew how to make a good and effective drawing which not even the engraver could destroy. That nice picture may be very badly engraved. Examine it! Do you find any marks of engraving intelligence? If a landscape, does the engraver appear to have had any notion of the growth of a tree, the formation of a mountain, the roundness and lightness of a cloud? Or is it all one flat unvarying set of monotonous and unmeaning lines, so that the treatment of one part would do just as well for any other part. In this first case you have an artist's work, in the second a mechanic's. Examine a figure subject in the same manner. You will not all at once become a judge of engraving, time and study are both needful. But the one clue to guide you out of the labyrinth of erroneous judgments is the constant recollection of the meaning of expression. Expressive work is artistic, inexpressive work is mechanical. The one is good, the other is bad.

DISCUSSION.

Mr. Fagan (British Museum) said he was not able to express any opinion on the particular point on which the paper turned, except to say that he agreed with Mr. Linton in his description of what wood-engraving ought to be. He did not see any art at all in those American illustrations which he was sorry to find were being imitated in this country. He was a great admirer of the old styles of engraving, for instance, those engraved after the beautiful designs of Albert Dürer and Hans Burgkmair which were incomparable in charm, not only in line, but in precision of drawing.

Mr. Quaritch said he understood very little of the technique of wood-engraving, his knowledge being rather historical. The most recent period in his mind, for he hardly knew anything of the New World, was that of Bewick, whose work had lived now for 100 years, and would still be admired for countless generations. At first he was employed on little children's books, which were sold for a penny or two, but now they were worth their weight in silver certainly, and were the admiration of collectors. When he became more accomplished he brought out his "Quadrupeds," in 1789, but that book never attained the popularity of the "Birds," the first volume of which appeared in 1797, and the second in 1804. Into that work he put all his artistic skill, so that even at the present day orinthologists said there had never been birds better designed than by this wood-engraver. Not only was his artistic skill very great, but his technique also was excellent, and even in recent editions the impressions were as good as in the first. His own predilections were in favor of early art, for now-a-days the printer was in such a hurry for the design that the artist was unable to do justice to his own genius, if he had it. The work of the present day corresponded very much with that of the *Nuremberg Chronicle*, which came out in 1493, the cuts being by Wohlgemuth, the master of Albert Dürer; it was a stout folio volume, with nearly 2,000 engravings, and must have been one of the most popular works of the day, large editions being printed in both German and Latin. This chronicle was produced for the same purpose as much of our own modern work, simply to amuse the people, but while the former would last for thousands of years, modern art would find its way to the waste-paper dealer.

Mr. W. Biscombe Gardner said he quite endorsed everything Mr. Linton had said.

Mr. Forbes Robertson said it was a great satisfaction to listen to one who was the living authority on his art, and who in his own work showed that he inherited all the best traditions of Bewick, the father of wood-engraving. He went with him entirely in his enthusiasm for the beauty of line, when the line was the creation of a master. He did well to mark the change introduced by Thompson when he adopted the black, instead of the white line, a change which was apt to escape notice. He should have liked Mr. Linton to have gone from the period of Bewick and his immediate disciples to note the change that had come over not only the practice of wood-engraving, but the tastes of the people. Line engraving in England, not only on wood but on copper, was, perhaps, the finest in Europe. Why was line engraving so much admired? Because you could go back to it again and again; because the line was full of thought and intention. And why had the other style come in? Because, as Mr. Quaritch had said, people had not time to wait for other. He was as great an admirer of line as any one, and was proud of his collection of Sharp, Strange, and other engravers; but the new style, the mixed style, came in fifty or sixty years ago, when Robinson, Doo, and others began to use line only in parts. At the International Exhibition in Black and White, in Vienna, a few years ago, he was much struck with the picturesque look of this new school, which had chiefly arisen in America, though it was taken there by foreigners, and he thought Mr. Linton had rather underrated that mixed style. It commended itself to the eye at once by this quality of picturesqueness. They went in for values, tone, light, and shade, immediate effects, as was done by the French school, in contradiction to the more painful stippling and line work to be seen at the schools of the Royal Academy. It was the drift of the age, and it commended itself to a far larger *clièntele* than the other, because it addressed the eye at once, whilst line required time, not only to do it but to appreciate it. He was glad to hear Mr. Linton say that there were some of these engravings which were pleasant to look at, but as far as art, *per se*, went, every word he had said was pure artistic gospel. Nothing could exceed the beauty of line, and when it came to the expression of the softer tissues of the human form, some of the works of Sharp and Strange were to the man who had an eye to see, a joy forever.

Mr. Stannus expressed the pleasure with which they had listened to Mr. Linton, whom they all looked up to as the patriarch of the art. The white line might be called the negative effect and the black line the positive; and it would be seen that the positive was the first system employed. The old wood-engravings referred to by Mr. Quaritch were all positive; and so were steel and copper engravings, the effect being obtained by black line, though on these latter there were often little stipples between. There was also another kind of engraving which obtained about 30 or 40 years ago, practised by Roffe, in which the effect was obtained not by line but by dot. There were thus two positive forms — the positive line and the positive dot, and also two negative forms, the white line introduced by Bewick, and of late years the negative form of the dot, little white dots being chipped out, of which Timothy Cole's work was an example. Line was exceptionally admirable for showing form; a shadow cast by a straight edge against a moulding would give the shape of the moulding, and a limb might be so perfectly indicated that a sculptor might model from it. He was much interested in what was said about texture, which could best be shown by line unquestionably, by the direction, thickness and quality of the line, whether smooth and sweeping, or a cramped and scrabby line, but he would not like to say that line was the only means; but Mr. Linton had said nothing about line as regards color, and it was in this direction that the new engravers had developed. Color was equally an art effect, and one to which more attention was paid than formerly. We no longer had the almost colorless pictures of Fuseli, West and Opie, but the full-blooded pictures of the present day, and line engraving was scarcely adapted in all cases to give this quality. He was in hopes Mr. Linton would have brought some examples of wood-engraving, and he believed that most of the audience were equally expecting to see the two schools, the old and the new, contrasted; and were equally disappointed as himself. He hoped that Mr. Linton would favor them with an exhibition of his work on some future occasion; and he begged to move a hearty vote of thanks to Mr. Linton, whom he hoped would long be spared to enrich English art by his productions.

Mr. H. Trueman Wood thought the recent school of wood-engraving in great measure owed its faults and merits alike to photography and the public taste as influenced by photography. In that very room he had heard a lecturer on photography holding up an excellent old woodcut and a modern one by the side of it, point out that by means of photography the public taste had been educated to look for something better than they were satisfied with twenty years ago. The public had got to look for minute detail, and the exquisite rendering of tone and color effect which they found in photography, and hence were not satisfied with the semi-conventionalized older forms of wood-engraving; but this public taste for photography

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had somewhat avenged itself, for the recent school had succeeded mainly in copying the faults of photography, so that many of their engravings looked like badly exposed photographs. It seemed to be much easier to copy photographic faults, flatness and absence of vigor, than to render that microscopic minuteness of detail, which was in part one of the beauties and in part one of the greatest defects of photography. On the other hand, some of the more recent school of photographers — the impressionist or naturalistic school as they were called — tended to imitate inferior wood-engraving, to strive after effects which photography was not capable of rendering, whilst dispensing with those which it would render most satisfactorily. Possibly by means of photographic methods they might get back again to a more vigorous style of work. The modern periodical press, which now depended for its illustrations to a large extent on photographic methods, demanded a rapidity which was incompatible with the finer quality of work, and consequently a bolder and more vigorous style of work was inevitable, and a tendency in this direction could already be traced in periodical illustrations. He should like to know if much of the very fine work in the modern style was not first drawn on a larger scale and then reproduced on a small scale by means of photography, so that the fineness was to a great extent artificial.

Mr. G. Bernard Shaw wished to say a word on behalf of art critics, who had been rather roughly handled in the paper. In the first place the notices in the press, which approved of these engravings in *Harper* and the rest, were not contributed by art critics at all, but by reviewers. Still he admitted that the art critic was often more favorable to this style of engraving than Mr. Linton thought he ought to be. Art critics were much more in communication with artists than with engravers; and the one thing above all which an artist resented was that knowledge on the part of the engraver of which Mr. Linton had so well spoken; for to the artist a great deal of that knowledge was altogether intolerable. The worst possible landscape painter was the man who knew that a tree was green, because, as a matter-of-fact, for artistic purposes a tree was very seldom green. A painter of the impressionist school put into his picture a number of conditions which you saw in nature which used not to be put in pictures at all except by the men of genius. Suppose an impressionist made a drawing in black-and-white of a scene such as you might often see in England, say a bit of rising ground on a Surrey common on a gray day, with a couple of figures just coming into sight over the brow of the rise. He would draw what he saw, not what he knew to be there; he might know that the man had two buttons on the back of his coat, but he would not draw them because he could not see them. But when that drawing went into the hands of an engraver who had this theory of representing what he knew by appropriate lines, he would not produce what the artist had really seen on the brow of the hill, which would be simply a couple of flat dark tones against another lighter tone representing the sky, but he would want to represent the modelling of the figures' arms and the roundness of the tall hats, and all the rest of it, which he knew were there, and the result was that he produced an entirely false picture and made the artist furious. In the old schools of engraving there was too much of this knowledge expressed by lines. It seemed to him that the modern school of engraving aimed at representing tone correctly, and what was actually seen; though he quite admitted that in many of these engravings there was a deplorable lack of the forms which were seen, and which ought to be represented by line, but were not. Nothing was much more unlike the surface of the human hand than the side of a block of wood-paving, and yet he had seen in magazine illustrations these two things represented in exactly the same manner. There the knowledge of which Mr. Linton spoke ought to have come in. Still, modern engraving, with all its defects and omissions, was not more offensive than the old-fashioned engraving in which you missed tone and atmosphere. In some of the best work of Mr. Gardner you had the combination of the two. Mr. Linton's thoroughly good and fruitful lecturing work would recall the men who had educated themselves in tone to the work they could do in the way of line. If they would learn this lesson without losing their command of tone, there would be an enormous advance on the old school of engraving.

The Chairman (Mr. William Simpson) said he was not an engraver, and could not, therefore, give an expert opinion on the question raised; but he was inclined to agree with the view put forward in the paper. He was at one time a lithographer, and in drawing on stone, the grain on it produced small dots, but even there it was usual to indicate lines by a stroke of the chalk, for the best work. A very good illustration of Mr. Linton's theory might be found in a comparison between the line engraving and mezzotint; every one knew how much superior a line engraving was to a mezzotint. He felt that this question of the two different ways of producing an effect had a broader relation to art than to the mere question of this paper. It reminded him about the question of legitimate and illegitimate water-color, as if there were only one school and one line of art to follow. He was rather inclined to allow of various ways, not only in water-color, but in oil painting, and in every branch of art. Still in the main he agreed with Mr. Linton as to the value of line in wood-engraving. He concluded by putting the vote of thanks, which was carried unanimously.

Mr. W. J. Linton, in response, said he had unfortunately failed to hear what was said by Mr. Bernard Shaw, but he agreed with what had been said by Mr. Wood about borrowing from photography, and the endeavor to do by woodcuts what was much better done by photography, and also the endeavor to obtain certain effects in a way which had misled engravers very much. The specimens which Mr. Stannus had brought were quite sufficient to prove his case. He would take the one by Timothy Cole, because he knew him personally, and when he first made his onslaught on this new system Mr. Cole called upon him, and said he perfectly agreed with him. Since then, however, he had to some extent changed his methods. The engraver of the "Sower," which Mr. Stannus had brought, would perfectly exemplify every fault he had mentioned in the paper; the hand and foot were badly drawn, there was no form represented and no perspective. Color could be given without line, but color did not represent form, and he was speaking of form and the varieties of form. He could not see the distinction between positive and negative which had been attempted. If he drew an object with white chalk on a black board, or drew the same thing with the same lines in black on a white surface, why should one be called positive and the other negative? He did not object to dots, or anything which might be brought into use, only, if you had lines, was it not as well to consider whether you could not make them beautiful and expressive.

The Illustrations

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

DOORWAY TO HOUSE OF MRS. CHARLES BLAKE, BEACON ST., BOSTON, MASS. MESSRS. STURGIS & CABOT, ARCHITECTS, BOSTON, MASS.

[Helio-chrome issued only with the International and Imperial Editions.]

A GENERAL view of this house was published in our issue of January 4th last.

APARTMENT-HOUSE ON CLARK ST., NEAR FULTON ST., BROOKLYN, N. Y. MR. CHARLES P. H. GILBERT, ARCHITECT, NEW YORK, N. Y.

BUILDING FOR THE CENTRAL RAILROAD OF NEW JERSEY, CORNER OF WEST AND LIBERTY STS., NEW YORK, N. Y. MESSRS. PEABODY & STEARNS, ARCHITECTS, BOSTON, MASS.

BANK AND OFFICE BUILDING FOR WILLIAM M. DUNCAN, ESQ., NASHVILLE, TENN. MESSRS. THOMPSON & GIBEL, ARCHITECTS, NASHVILLE, TENN.

STATIONS AT GRAHAM AND SALEM, VA., ON THE NORFOLK AND WESTERN R. R. MR. GEORGE T. PEARSON, ARCHITECT, PHILADELPHIA, PA.

ALLEGORICAL RELIEF: THE UNITED STATES OF AMERICA. MR. CHARLES LAWES, SCULPTOR, LONDON, ENG.

A FEW words as to the significance of the various figures represented may not be superfluous. The United States holds aloft the torch of progress; Liberty bears the star-spangled banner aloft near Commerce with the caduceus; and Peace presents the olive. Below are Indians, two figures representing abundance, and an expiring form which typifies the extinction of slavery.

This work, which Mr. Lawes, an English sculptor, intends for the World's Fair at Chicago, is now in the exhibition of the Royal Academy.

[Additional Illustrations in the International Edition]

CLOCK-TOWER AT BERNE, SWITZERLAND.

[Copper-plate Etching.]

LIKE bell-towers, which were once the sign of the independence of a city, clock-towers take a prominent place in municipal life, and, as the *Moniteur des Architectes* says, it is desirable to revive the taste which, during the Renaissance, supplied nearly every town of importance with them.

SAVINGS BANK BUILDING IN BUDA-PESTH, AUSTRIA. HERR NIC. VON YBL, ARCHITECT.

[Gelatine Print.]

BUDA-PESTH is noted for its splendid bank-buildings. The fountain in front of the one illustrated, which bears on its top a figure of Neptune, was erected as a memorial of the first savings-bank in the city, and is modelled after the fountains in the Place de la Concorde in Paris. The sculptor was Leo Fessler.

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HOUSE IN THE KOLOWRAT-RING, VIENNA, AUSTRIA. HERREN FELLNER & HELMER, ARCHITECTS.

[Gelatine Print.]

PRESTON ABBEY, SOMERSET, ENG. DRAWN BY MR. E. J. DODGSHUN.

GIGGLESWICK, YORKS, ENG. DRAWN BY MR. E. J. DODGSHUN.

ST. JOHN'S CHURCH, WATFORD, ENG. MESSRS. CHRISTOPHER & WHITE, ARCHITECTS, LONDON, ENG.

WE publish a general view of the proposed church of St. John the Evangelist, which is to be erected at an early date on the site of the present iron church in the Sotheron Road, Watford, Herts. It will accommodate when completed nearly 700 people. Owing to the shape of the site the nave of the church is nearly a square on plan, and contains a morning chapel in the south aisle and a baptistery apse at the west end. The church will be a lofty structure of a simple early Gothic type. The walling will be of Kentish rag facings, Box ground stone dressings, and will be roofed in with stone slates.

ST. MATTHEW'S CHURCH, GRANDPONT, OXFORD, ENG. MESSRS. CHRISTOPHER & WHITE, ARCHITECTS, LONDON, ENG.

THIS church is being erected in the Marlborough Road, Grandpont, as a chapel of ease to the parish church of St. Aldate, Oxford, on a site given by the Fellows of Brasenose College. It contains 560 sittings. The design of the church is Perpendicular, and is of simple character. It was felt that a tower was hardly in keeping with a chapel of ease, and, therefore, a somewhat unusual feature has been adopted, viz., a belfry over the porch, it being separated from the church and porch entrance by vaulting so as to deaden the sound of the bells inside the building. The external walling is of Gibraltar stone, with Box ground stone dressings, and the roof is to be covered with Colley Weston stone slates with stone ridges.

BOOKS AND PAPERS.

WE do not have much faith in the advantages of ready-made specifications to the practising architects.[1] If they are full enough to be used for any given building without much change, they need a great deal of scratching out and changing to adapt them to another building; and if they are made so general as to suit the average building, they need so much filling out for each particular case that it is not much more trouble to write the specifications from the beginning, and the result is usually better. Where such documents are really serviceable is in the library of the draughtsman and young architect, who find it of the greatest benefit to compare specifications, and thereby improve their own form. No matter how much pains an architect may take to draw up a perfect set of such documents, he will always find something in the work of others from which he can get a useful suggestion for his own; and he should be ready to impart to his brethren any valuable points which may have occurred to him. Mr. Cooper has fulfilled his duty in the latter respect by publishing the forms used in his own practice, and these, being unusually clear and full, will furnish many hints, even to experienced architects, while, on account of their completeness, they will answer well for a second duty, that of serving as a standard with which the younger men can compare their own productions, to see if anything is left out.

Occasionally, without doubt, these specifications will serve a good purpose by simply filling in the blanks, and they have the advantage, for this purpose, of being printed in aniline ink so that they can be copied entire in an ordinary press copybook.

COMMUNICATIONS.

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

TO ARREST DECAY IN SANDSTONE.

NASHVILLE, TENN., May 19, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Will you kindly inform us, if you know of any preparation that will arrest decay in sandstone, and oblige,

Truly yours, THOMPSON & GIBEL.

[THE best ordinary process consists in saturating the stone as deeply as possible with a solution of silicate of soda, followed by a solution of chloride of calcium. The double decomposition leaves the pores of the stone filled with silicate of lime, the chloride of sodium washing out. The application of the process requires care, and some experience. The solutions should be applied very weak, and several times, at intervals, alternating the soda and lime solutions. If the silicate of soda solution is too strong, it will form a gummy coating, which will prevent the penetration of the subsequent solutions, and will effloresce later, spoiling the appearance of the stone. — EDS. AMERICAN ARCHITECT.]

MANNESMANN STEEL.

WATERBURY, CONN., May 20, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs. — Is there not some mistake in the article which appears in No. 751 (May 17) of the *American Architect*, headed "Mannesmann Steel in Germany," — we quote the portion to which we refer, as the measurements given when reduced to inches would seem to indicate a thickness of metal for the walls which would be impracticable for the process referred to.

"Near giants of from 200–375 mm., diameter there are dwarfs of a pencil-like size, and under tubes *of from fifty* (19⅝″) *to sixty* (23½″) *centimetres thickness of wall*, hang others of less than 1 mm., thickness."

Then again the length given of ninety English feet as that of a tube which has been rolled by this process would seem to require modification or would admit of a most interesting explanation.

If any correction is to be made we would be glad to see it appear.

Yours with respect, RANDOLPH & CLOWES.

[FOR centimetres, in the paragraph referred to, should evidently be read millimetres. As to the other questions, we must rely on our German correspondent for explanation. — EDS. AMERICAN ARCHITECT.]

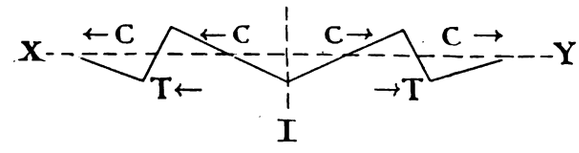
BEAMS.

CLEVELAND, OHIO, May 13, 1890.

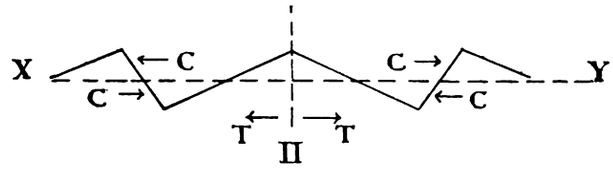
TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — Having just read in the last number of the *American Architect*, Mr. Louis De Coppet Berg's answer to your editorial remarks on the compound beam, I was struck with the peculiarity of Mr. Berg's argument; namely, that first he assumes that the beam is acting as a whole, and then by a course of reasoning, apparently proves that the strains are reversed under these conditions, so that the construction of the bevels must be reversed, which consequently makes the beam into two parts, so that it is not acting as a whole and the premise is disproved: *reductio ad absurdum.*

What seems to me to be the fault of the argument consists, first, in the fact that Mr. Berg makes his neutral axis follow the zigzag course of the splicing, and second, that the direction of the forces is not considered. If the beam is acting as a whole, the division line between the particles that are in compression and those that are in tension, would be exactly along the centre of the beam parallel to its top and bottom surfaces, and if the beam is composed of two equal halves, it would be half-way between the top and bottom points of the splices, and both the compressive and tensile strains would be away from the centre of the span of the beam, as indicated in the accompanying sketches I and II. In what seems to me to be the proper construction — Sketch II — there would be a



I



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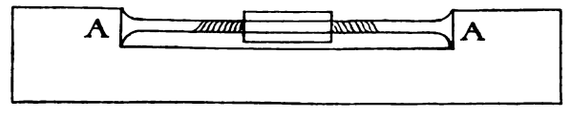

III

point, in the lower piece in each abutting surface that would be in compression, as indicated by the arrow heads. Sketch III, showing a piece of wood, as a whole in tension, from the action of a screw, illustrates this, as the points *A A* would be in compression.

[1] Specifications for Mason-work, Carpenter-work, Painting, Plumbing, etc., by G. Edward Cooper, Utica, N. Y. 1890.

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If Mr. Berg's theory and construction is correct, the small triangles of the lower beam above the neutral axis X Y, being in tension would be useless and might as well be cut out.

Very respectfully yours, Clarence O. Arey.

[This is quite an interesting point. We do not think, however, that Mr. Arey states Mr. Berg's position quite fairly. Mr. Berg thinks that in the compound beam there is practically but one neutral axis; all the fibres above this being in compression, and all below in tension. Rankine and his followers think there are two, which without bolting and notching, would be in the middle of the two portions of the beam, but which can be made to approach each other by the bolting and notching, the strength of the compound beam increasing as the neutral axes are brought nearer together; and the question is by what mode of notching can they be best made to approach. — Eds. American Architect.]

New York, N. Y., May 23, 1890.

To the Editors of the American Architect:—

Dear Sirs,— Mr. Clarence O. Arey has evidently not read my letter very carefully, or he would not make the above statement. Instead of claiming that strains are reversed in compound girders, what I did claim was that the theory of strains would have to be reversed if beams are notched in the manner which seems to meet with Mr. Arey's approval, while if they are notched in the way I have shown them in my book, there is no necessity for us to go out of our way to get up new theories of transverse strains.

In regard to the statement in the last three lines. This is, of course, obvious. The neutral axis, theoretically, would be along the exact centre of the beam, in which case the small triangular ends of the notches would have no duty to perform; their resistance, however, would be but trifling at best; I prefer, therefore, to rely upon the broader trapezoid-shaped parts of the wedge to do the work; but, even if these triangles were useless, it would not be necessary to cut them out (as suggested by Mr. Arey), because the neutral axis will never be in the exact centre when the beam is strained transversely, but will vary more or less in its position according to the difference in the resistance capacity of the beam fibres to compression and tension.

By referring to page 211 of my book, Mr. Arey will find the manner in which I calculate the keys in key girders, and I state on page 216 that the same method is to be used in calculating the notched girders. If he will take the trouble to read these parts, he will see that I allow only the respective compression or tension on each key above or below the neutral axis; and I think that each wedge-shaped piece in the notched beam can safely be similarly calculated.

Very respectfully yours,

Louis De Coppet Berg.

Notes and Clippings

An Historic Mansion Burned.— An interesting old mansion was destroyed by fire in Claverack, N. Y., on March 26 last, a mansion whose history dates back beyond the Revolutionary war. To the present generation it was known as the "Watson Webb house," from the name of its owner in the early part of the present century. Although the old mansion was the scene of many a merrymaking in colonial days, and saw many a bloody affray in the Revolutionary war, being on debatable ground when the British were trying to cut their way through to New York from Lake Champlain and Saratoga, and, although General Lafayette was sheltered under its roof, it is, perhaps, best remembered as the spot where the verses were written beginning:

> "'T was the night before Christmas, when all through the house
> Not a creature was stirring, not even a mouse."

It was in 1704 when Kiliaen Hogeboom left Amsterdam, to take possession of a tract of land eight miles square, now including Claverrack, three miles from the Hudson River and to the east of the city of Hudson. It was purchased from Chancellor Livingston. Kiliaen Hogeboom's son Jacobus began building the old mansion in 1727. It had generous halls and big rooms and had a frontage of 63 feet, along which ran a capacious porch. Over the porch clambered an ivy, which, as years rolled by, stuck its roots deeper and wider into the soil, and extended its shade over portico and mansion. The interior was finished in the highest style of Dutch art. The fireplaces were of tiles illustrating Scriptural subjects, and were brought from Amsterdam. The mantels were of wood and were quaintly and curiously carved, and mural paintings served for a picture-gallery. It is said that the furniture and expensive bric-a-brac brought from the old country made the mansion one of the most delightful places to be seen at that time in the Hudson River valley, and that Dutch hospitality made the spot famous for good living up and down the river. It was during the Revolutionary war that the house was most famous for its hospitality. The property had descended to General Samuel Webb, an officer in the Continental army. General Webb had married the granddaughter of Jacobus Hogeboom. It was when Lafayette was on a visit to General Webb that Lafayette etched on a window-pane with his diamond ring his name and the date of his visit. — *N. Y. Sun.*

Draining the Valley of Mexico.— The drainage of the great valley of Mexico, which has at last been definitely undertaken, will be one of the most interesting works in the history of engineering, whether we look at the stupendous proportions of the project, or at the magnitude of the sanitary advantages which will accrue from its completion. A sanitary engineeer would say that the capacious valley, in the middle of which lies the city of Mexico, was, notwithstanding its fertile soil and admirable climate, not intended by nature for the habitation of a teeming population. It is a deep cup-like depression, surrounded by a mountain rampart and possessing no natural outlet for water or sewerage. Nevertheless, for many centuries, not only since the Spanish conquest but in Aztec and the still remoter Toltec times, the valley has been densely peopled. The result is that the ground on which the large cities stand reeks with corruption, and the adjacent stagnant lakes are clogged with age-long accumulations of filth, engendering the most dangerous miasmatic and typhoidal conditions. If the masses of the Mexican people were not in the habit of drinking pulche instead of water, they would be continually decimated, for it is impossible in the city of Mexico to procure pure drinking water except by distillation. Under the Spanish viceroys, an attempt was made to drain the valley, and a tunnel for that purpose was driven through one of the rocky walls that hem it in. But through some miscalculation of the constructors, the opening was begun at too high a point and is now useless. The new boring will be made at a level low enough to effectually drain the lakes. — *N. Y. Ledger.*

Trade Surveys

The centralizing tendencies in trade, commerce and in manufacturing are being strengthened by a host of influences actiug far beneath the surface. Investors, stockholders in all kinds of corporations and companies, promoters of new enterprises, speculators and schemers seeking opportunities for fortune-making, and all of that vast class of persons who live by the exercise of their wits, energy, capital and enterprise, are lending their influence in this direction. They are tired of old conditions, desire to see a newer *regime*, and establish, if possible, a broader platform on which to do business. They are quite willing that even higher tariff duties should be established, if they will help business; that a radical silver law should be agreed upon and immediately enacted, and that schemes of internal improvement should be adopted and pushed by the Government; and, in fact, anything done that will arouse confidence and stimulate energy in every department of trade and industry. There is no organized cohesion among all of these varied interests, but they are working in the same direction, and their interests are one. Railroad presidents, the presidents of manufacturing corporations, and active agencies in a host of smaller concerns are all seeking for and lending their influence, great or small, in the direction of an expansion of capacity and enlargement of trade. On the other hand, capital is being organized to prosecute schemes for stimulating the exportation of American products, and those who are at the head of these enterprises think that in certain lines our exportations can be within a short time quadrupled; they entertain rather extreme views as to the possibilities in this direction, and are backing up these views with promises of heavy investments of capital. All these people, who are at the head of existing or projected enterprises, desire to be perfectly free to act, and clear from entanglements which would result from a monetary stringency. The money-lending interests have withdrawn almost all their opposition to this new and mighty factor; they instinctively feel that it is bound to have its way, and they propose to make the best of it. It is just possible that a presidential veto may be interposed at the last, but the power behind the throne will, no doubt, express itself in political directions in no undecided manner. The spirit of organization and expansion is being rapidly developed in the South and Southwest; conventions of one kind or another are being held; new political movements are gaining unexpected strength; new leaders and agitators and exponents of new ideas are coming to the front.

The old political element in these States is just now discovering that the industrial and commercial spirit diffusing itself everywhere, is about to effect a genuine and lasting revolution in these sections. In other words, a harmonizing movement is going on in all sections of the country, as a general outgrowth of the diversification of industries which has been in progress since the war. Only now are the fruits of this movement being manifested in a manner that we can understand. Until within a recent period the country was united only politically; it is now becoming energized and solidified by the same industrial, economic and commercial ideas, so to speak. An identity of interests is being manifested in all sections; this has long been merely a theory; now it is a reality. This result has been due, as stated, to the diversification of industries; and this has been made possible by the enormous investments of capital in manufacturing enterprises of a thousand kinds, the construction of railroads, the infusion of new blood. Every week exhibits an increase in the volume of business as compared to the corresponding week last year. For three months past margins have been rather close, and still are narrow, but the summer and fall requirements which have just been presented have allowed a little improvement. The manufacturers of textile goods are encouraged. The industries of New England are thriving; wages are settling down to a fixed basis, and all elements of cost can be counted upon with far more certainty than was possible five years ago. The industries of the Middle States are prosperous; the iron trade is very active. Mills are working double turn in all sections of the country. The production of coal is slightly greater than up to this time last year, and the opening of new mines, reported in so many States, is evidence that the present supply is not in excess of the demand. The rapid spread of little industries into new sections is stimulating the building of new coke-ovens in several States. The manufacturers of building material, builders' hardware, and construction material of every kind, have as much work as their present capacity can conveniently take care of. Throughout the West there is a spirit of confidence which manifests itself in the projection and promotion of a multitude of new enterprises. Throughout the far Northwest agricultural lands are improving in value, first, because of the increasing demand for good land, and second, because of the fair markets for agricultural products which, in spite of all assertions to the contrary, still exist. The farmers are prospering and making money, after all said and done. Their condition is gradually improving, and the railroad companies are treating them with more consideration and a clearer recognition of those rights which are not clearly definable by law.

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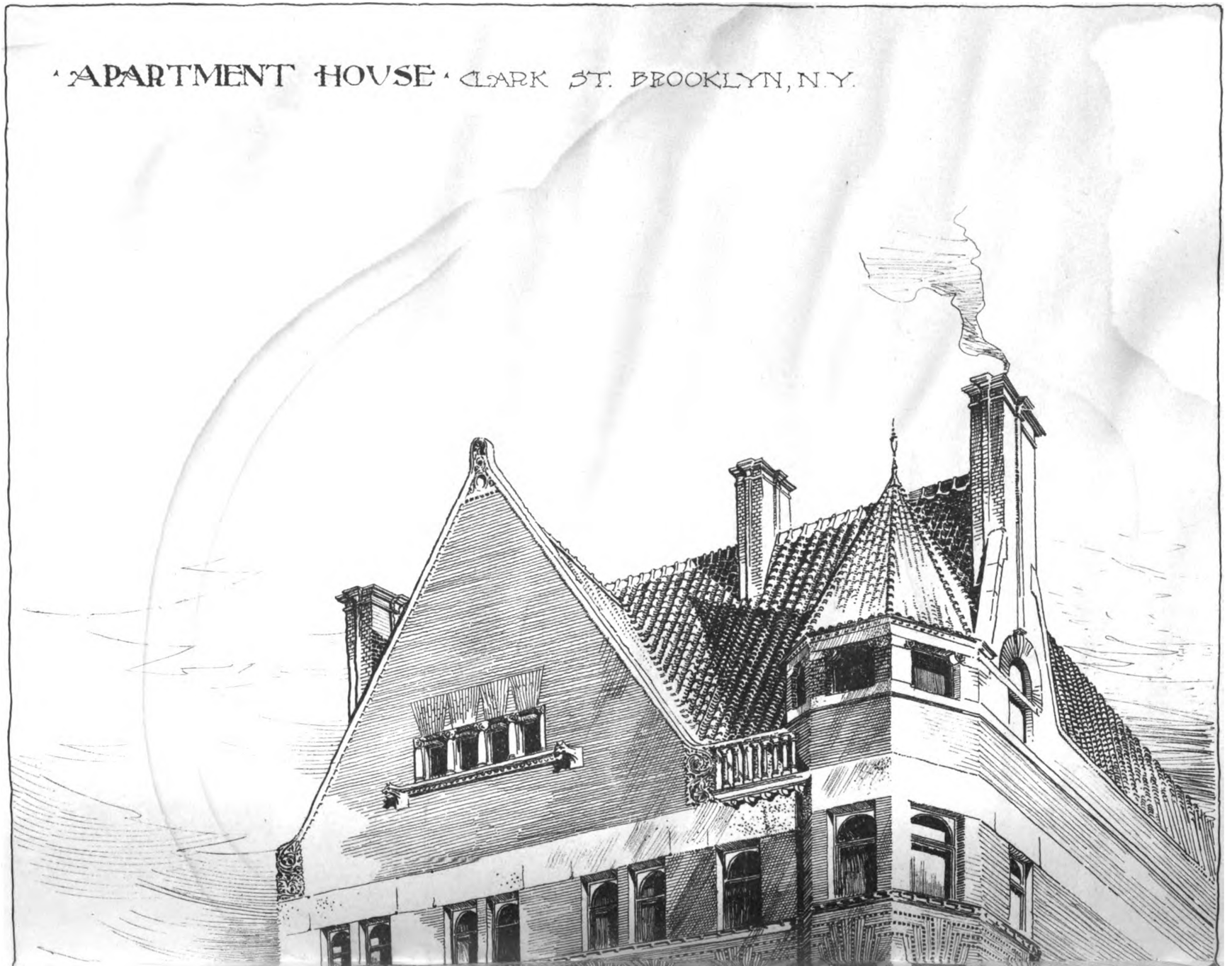

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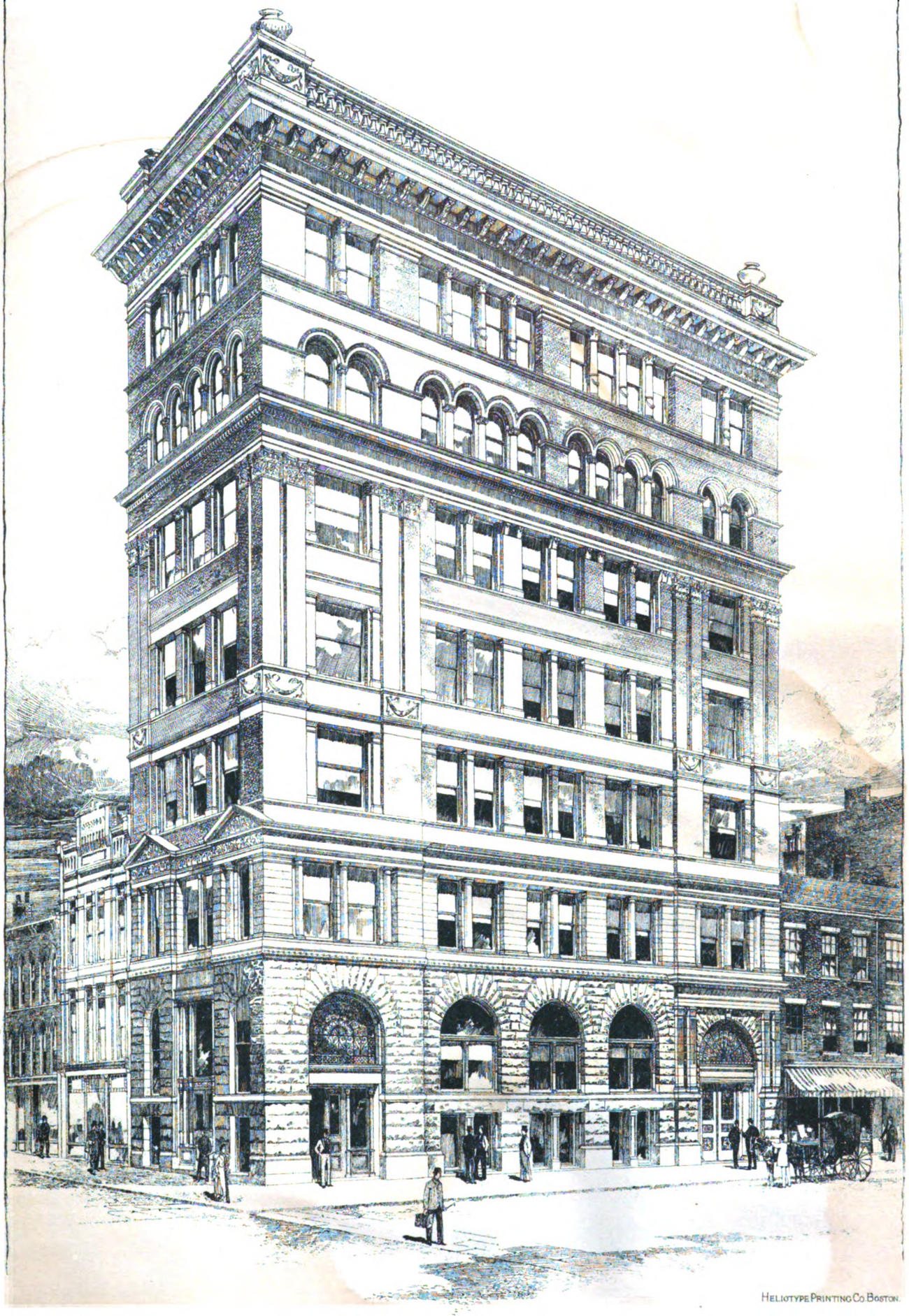

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JUNE 7, 1890.

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THE Fellowship in Architecture at Columbia College, founded a year ago by that generous friend of art, Mr. Frederick A. Schermerhorn, and open to all graduates from the architectural course of the College, under thirty years of age, has been awarded this year to Mr. Arthur A. Stoughton, of the class of '88, from among about twelve competitors. The income of the scholarship, which is awarded every second year, now amounts to about thirteen hundred dollars, which must be used by the holder in travel and study abroad.

ACCORDING to the Philadelphia *Ledger*, the *Carpenter*, the official organ of the United Brotherhood of Carpenters and Joiners, has published, or is about to publish, a statement by the General Secretary and Treasurer of the Brotherhood, Mr. McGuire, which contains, among other matters of no interest to the profession, the assertion that the Builders' Exchanges, in resisting the strikes of the past month, "have gone so far in some cases as to combine with the architects to exclude competent and skilled men from an opportunity to estimate on work that they might do." Now, without questioning Mr. McGuire's intention to be perfectly accurate in his statements, which in other respects seem to be made with commendable care and moderation, we would very much like to know what architects have ever "combined" with any Builders' Exchanges for any purpose whatever; and, most of all, for the purpose of excluding from estimating on their buildings any persons whom they thought likely to carry out contracts with honesty and skill, and at a price lower than that which would be asked by the members of the Exchanges. We ought not to have to point out to any reasonable man that architects do not care for the questions in dispute between contractors and their men; it is the senseless and ruinous way in which the dispute is carried on, destroying their business, as well as that of the contractors and the men, which attracts their attention and disapprobation. So far as the present commotion over shorter hours is concerned, it is easy to see that architects would be considerably the gainers by the universal adoption of an eight-hour day, at nine hours' wages. Notwithstanding the pretences of the Socialists, every one knows that this change would increase the cost of building ten or twelve per cent, and as architects' commissions would be correspondingly increased, they would have no interest in opposing a movement, which, indeed, many of them favor on theoretical grounds; but they have a right, as architects, to object, and do object seriously, to having the discussion of the subject begun by the collapse of their whole season's business at the order of a few walking-delegates, while as free American citizens, they resent and protest against the violence and tyranny with which the same walking-delegates coerce the poor and timid workingmen into a reluctant support of their schemes. There are no better friends of the workingmen, we need hardly say, than the architects, who soon learn to observe and appreciate the modest thoughtfulness and industry which mark the deserving mechanic, and to rate at their true value the claims of the idle and loquacious botch; and if an eight-hour day, or anything else, would make the good men and their families more comfortable and happy, they can always rely on the architects to help them to get it, and we can assure them that the support of such a body would be of more advantage to them in negotiations with their employers than all the boycotting, picketings, hustlings, beatings and persecutions that their newly-imported leaders can devise.

MR. FRANKLIN W. SMITH, of Boston, the designer and owner of a noted Moorish villa in Florida, and the originator of a scheme for a Roman mansion in the same State, which has, we believe, not yet been carried out, has, in pursuance of the same enthusiasm for reproductions of antiquity, just completed a Pompeiian house at Saratoga. According to the newspapers, his efforts after an accurate imitation were for a long time baffled by the opposition of the Italian Government, which "jealously guarded" the original models, as well as by the "impossibility of finding artists familiar with the style of coloring." We had supposed that the decorators who claimed, at least, to be familiar with the Pompeiian "style of coloring" might have been readily found anywhere; but perhaps their idea of it was not accurate enough to satisfy Mr. Smith's taste, and the end of the matter was that he took some "Salon artists" to Pompeii with him, "to catch the spirit of the decoration," and then brought them to Saratoga, to "transfer it to the new world." As now built, the house comprises the usual atrium, peristyle and so on, adorned with columns, tripods, statues and pictures, and paved with mosaic, in which appear representations of "a fierce dog," with an inscription, "Cave Canem," and another inscription, "Salve," both these devices having been copied from the Pompeiian originals, which the "jealousy" of the Italian Government appears to have been unsuccessful in guarding from the eagle eye of the Bostonian. Archæologists will be curious to see the "rare engravings," which, we are told, are scattered over the "carved marble tables" of the "bibliotheca," with rolls of parchment and similar antiquities; but the whole affair seems to be cleverly designed, and to be, at least, more successful as an educational curiosity than the celebrated Pompeiian Court at the Crystal Palace.

ARCHITECTS will be rather surprised to learn from the Boston *Journal* that "Baltimore is to have a Jewish synagogue, which will be the only specimen of Byzantine architecture in the United States." We must confess that we had supposed many of the synagogues in New York and elsewhere to be good examples of the clever adaptation of Byzantine architecture to congregational uses which is now so popular among the Israelites, while hundreds, if not thousands, of other buildings in this country claim, with more or less justice, to be in the Byzantine style. So much harm is done to the development of architectural knowledge and taste by the ridiculous ignorance of the people who write about architecture in the daily papers, that it is doing the public a service to hold up to derision the worst of these blind leaders of the blind, if only to remind them that a little acquaintance with the greatest and most ancient of the arts does no discredit to a literary man, and may even be occasionally of service to one who makes that art the subject of his lucubrations.

WE wish to call the attention of the mill mutual insurance companies to the description of the new immigrant landing-depot, to be built on Ellis's Island, in New York Harbor, which we find in the New York *Herald*,

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specially requesting them, however, to observe that the structure is not designed by one of their *bêtes noires*, the architects. According to the *Herald*, the new building, in brief, is to be four hundred and ninety feet wide, and three hundred and thirty feet deep, with "an immense dome" one hundred and twenty-five feet high, and several towers. The construction is to consist of "wrought-iron columns, with walls of wood between." The main side-walls will be formed of "two-inch planking, tongued and grooved," and "inside the planking will be tarred paper, and inside of this the rooms will be finished in yellow matched pine." "As an outside covering, corrugated galvanized iron will be put on over the two-inch planking." Besides this interesting structure, there are to be "hospital buildings, erected on precisely the same plan," besides an engine-house and quarters for an electric-light plant. Water is to be brought from New Jersey, in pipes, but we trust, for the sake of the thousands of immigrants who will be crowded into the building, that an efficient apparatus for extinguishing fires with sea-water will be provided.

HERR CARL HINTRAGER, Architect, of Vienna, whose contributions to the literature of school-house building we have before mentioned, as well as his admirable plans for a large school-house in the Tyrol, has published a second pamphlet on the subject, which we can highly recommend to those of our readers who understand easy German, and will take the trouble of sending to the author for it. The pamphlet is simply a report of a lecture delivered by the author last February before the Austrian Society of Engineers and Architects, but it contains the latest and most concise information that we know of on the subject of the construction of common school-houses in various countries, illustrated with plans, and tables of statistics. We do not like to appropriate other people's work too liberally, but as most of our readers would probably not understand the original text, while the book contains matter of the greatest value to the profession, we venture to quote some of the most interesting matters. We all know that in France, of which the pamphlet treats first, the impulse to the great modern system of education was given by the Franco-Prussian war. With a courage and constancy which has done them undying honor, the French accepted their terrible defeat as a lesson, and, instead of blustering and howling about the "Lost Cause," and so on, tried to learn the reasons for the superiority of the Germans, and to reform their own habits in accordance with the principles which they found to have been most effective in giving moral and material strength to their neighbors. It did not take them long to find out that the schools and school training of the Germans were superior to their own. Jules Simon expressed the conclusion deduced by thinking Frenchmen from this fact when he said that "The people which has the best schools takes the first place among nations; if it is not first to-day, it will be to-morrow;" and immense preparations were made for reviving and extending education in France. In the year 1876, a special appropriation of twenty-four million dollars was made, for the purpose of building and furnishing common schools; and within the last ten years the regular annual appropriation for public education has risen from eight million dollars to nearly twenty-seven million.

ON the 17th of June, 1880, a code of regulations was published, which had been drawn up by the most distinguished experts, and gave directions for the construction and furnishing of school-buildings. This code, which was copied and commented upon everywhere, has since been much modified; but it was then a compendium of the best thought on the subject, and served, at least, as the foundation on which subsequent improvements could be advantageously based. In accordance with the new rules, a competition was invited for model plans for school-houses, and about twenty-five hundred dollars paid in prizes for thirteen successful plans. As might be expected, the new plans showed in unexpected ways how the directions of the code of 1880 could with advantage be modified, and on the 28th of July, 1882, a new code was published, containing rules for the most important matters in school-house construction, but allowing more liberty in detail than the old code. Under the new regulations, no primary school-house group, which consists, in France, of a school for boys, one for girls, and an infant school, in adjoining buildings, is allowed to accommodate more than seven hundred and fifty pupils, of whom one hundred and fifty must be provided for in the infant department. For a country one-room school-house, the maximum number of pupils allowed is fifty; in school-houses of more than one room, not more than forty pupils are allowed to a room. Every school-house lot must contain at least eight hundred square metres, or nearly nine thousand square feet; and every scholar must have at least fourteen square feet of floor-area in the class-rooms, and about two hundred cubic feet of air-space. The height of the class-rooms is fixed at thirteen feet, and the exact dimensions of rooms for forty or more pupils are specified, both for single and double seating. In regard to the much-vexed question of lighting, some modifications have been made in the original rules, and, as the regulations now stand, lighting from the left side only, while acknowledged to be preferable, is declared to be insufficient for rooms more than six metres, or about nineteen and one-half feet, in width. For rooms wider than this, windows are required in the right-hand, as well as the left-hand wall; but the right-hand windows are usually smaller than those at the left. Lighting from the back or front is not permitted. In nearly all French common schools the basement is occupied by a covered play-ground, opening by arches into the garden, where the children play and exercise in rainy weather, gymnastic apparatus being usually provided. A few years ago, great importance was attached to the teaching of drawing in common schools, but the instruction in drawing is now reduced to a very small amount, and, in place of it, both boys and girls have careful and thorough training in manual arts, including joinery, blacksmiths' work, modelling and carving, laboratory work, and even agriculture. In the details of construction, the recent improvements have been in the direction of ventilating and heating. The perforated glass panes in the windows, which were extensively used a few years ago, are now abandoned, tests having shown them to be nearly useless as ventilators, and regular provision for inlet and outlet of air is made, the sectional area of the inlet shafts being required by law to be about six square inches for each scholar.

A VERY historic estate in Brittany is offered for sale at a low price, and enterprising brokers or other persons, who have had enough of the practical side of life, and would like to see something of the poetical, will do well to take notice. The estate is that known as Elven, comprising four hundred and fifty-two acres of land, and an ancient castle, in tolerably good preservation, besides other buildings, and the price asked is only sixty thousand dollars. The readers of Feuillet's "*Romance of a Poor Young Man*" will probably have a vivid recollection of the part that the Tower of Elven plays in the affairs of Maxime and Marguerite; but, independent of its connection with a pretty novel, Elven Castle is noted as having been for some time the prison of Henry the Seventh of England, who, after the battle of Tewkesbury, fled to France, and was driven by a storm to the Breton coast, where he was seized, by order of the Duke of Brittany, and confined in the castle with his follower, the Duke of Pembroke. Besides this, Elven is in the very midst of the scene of the old Breton civilization. Morbihan, the chief place of the Druids, is close by, with the neighboring Carnac, next to Stonehenge the most remarkable group of prehistoric monuments in the world; and Auray, reported to have been King Arthur's habitation, is not far off.

A SENSIBLE judge seems to have been discovered in Denver. Mr. Edbrook, of the firm of Edbrook & Marean, made plans for a house for a Mrs. Wright, which was to cost thirty-six hundred dollars. It actually cost forty-one hundred and when the architect sent in his bill for services, he was coolly informed that the owner proposed to pay for her extra conveniences out of his pocket, and that she was going to keep his money for that purpose. Naturally, he objected to this arrangement, and brought suit for the amount. His claim was resisted on the usual ground, that if a building costs more than the owner wishes to pay for it, the architect must make up the difference between what the owner thought he ought to pay, and the actual cost. With most juries, and with a good many judges, an appeal of this kind strikes a responsive chord; but the judge in Mr. Edbrook's case laid down the law that "architects drawing plans for a house that was to cost about a certain sum could not be held responsible for what it cost to construct it over that amount"; and ordered judgment for the plaintiff.

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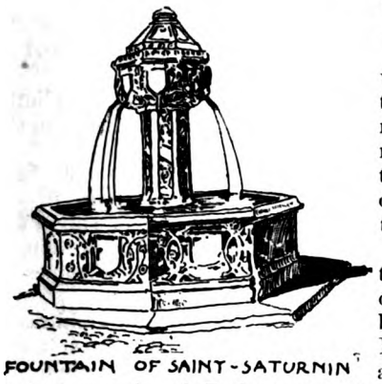
RELIGIOUS ARCHITECTURE.[1] — IX.

IV. RELIGIOUS ARCHITECTURE OF ANTIQUITY. — ROME.



FOUNTAIN OF SAINT-SATURNIN

WE give here an abstract of the passage from Vitruvius, which has stood the test of time, and, which, moreover, possesses the merit of clearly indicating the relationship of the divers types of temples to one another.

The earliest Greek temples were certainly of wood, as has already been stated; according to Polybius, the columns and porticos of the ancient temple of Dodona were burned, which shows that they were of timber work. Pausanias frequently mentions the preservation of the wooden remains of primitive temples in the reconstructed edifices. It may be admitted, as Quatremère de Quincy assures us, that, for buildings of such mediocre size, a simple wooden beam running from wall to wall on the principal façade was used to form an open vestibule before the door; this was probably the origin of the temple with antæ, the simplest type of the stone temple. The term *antæ* is applied to the quadrangular pilasters terminating the side-walls of the cella when projected forward to form the porch.

As the dimensions of the temple were increased, it became necessary to establish intermediate points of support beneath the beam, especially after the adoption of the stone architrave in the place of the wooden girder. And thus the type of a temple *in antis* was completed. The pilaster or anta was decorated in the same way as the intervening columns, which were generally two in number, though there were sometimes more. The temple on the Ilissus, at Athens, and the Temple of Fortuna at Rome, not far from the Porta Collina or Porta Salaria, belonged to this early type.

Vitruvius gives, as derived from the preceding, the *prostyle* form, in which the antæ were replaced by isolated columns, the walls of the cella stopping on a line with the entrance, instead of projecting. The façade was thus adorned with a porch, open at both extremities. This was the most common form of temples.

To embellish the temple still further, a similar porch was sometimes constructed on the posterior façade. Such structures took the name of *amphiprostyle*. The pronaos was repeated in the rear by the *opisthonaos*.

There were usually four columns on each face. These were increased to six when a row of columns was introduced on the lateral façades, in order that there should be no change in the proportions of the naos or cella of the interior; this number was, however, not obligatory, as examples are not wanting where it was increased to eight. The temples surrounded on all sides by columns were called *peripteral*. The Temples of Theseus at Athens, of Concord and Juno at Agrigentum, of Ceres at Segesta, of Corinth, of Sunium, and two of those at Pæstum, were *hexastyle;* that is, they had six columns in front. The Temple of Minerva, at Athens, had eight.

Instead of forming an open gallery all around the edifice, the columns along the sides were sometimes made to serve a purely decorative purpose, without encroaching upon the width of the interior cella. In such cases the columns joined the lateral walls; that is, they were engaged. This style of temple took the name of *pseudo-peripteral*. The Temple of Jupiter Olympus at Agrigentum, the Maison Carrée at Nîmes (Figures 8, 9), and the Temple of Fortuna Virilis at Rome (Figure 3), were of this type.

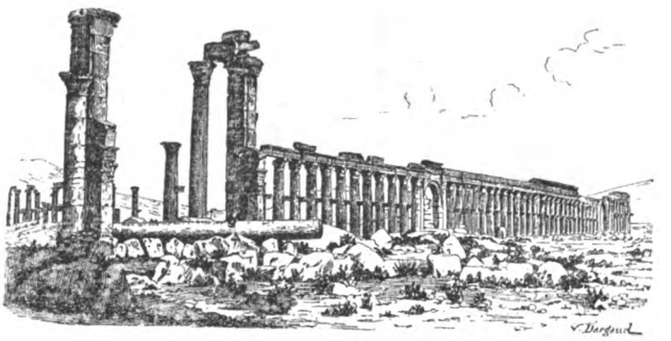


Fig. 10. Ruins of the Great Colonnade of Palmyra (3d Century A. D.).

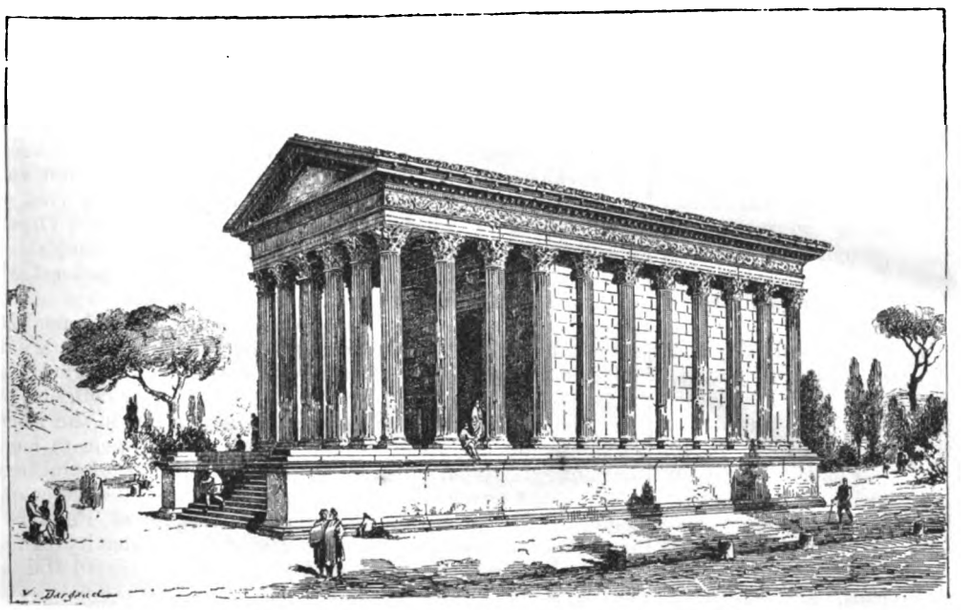


Fig. 9. View of the Maison Carrée at Nîmes (2d Century A. D.).

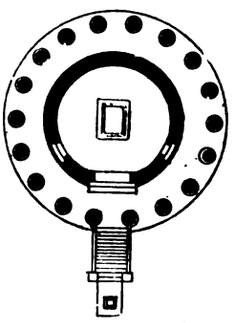


Fig. 11. Plan of the Temple of Vesta at Tivoli (1st Century A. D.).

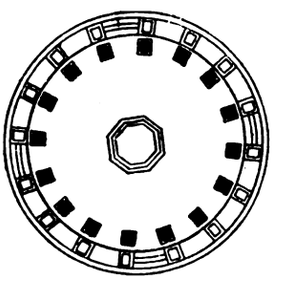


Fig. 12. Plan of the Temple of Jupiter Serapis at Pozzuoli (1st Century A. D.).

To create a more ornamental style, the surrounding colonnade was doubled, thus forming the *dipteral* type. Such were the Temple of Diana at Ephesus and the Temple of Quirinus at Rome.

The inner row of columns was sometimes omitted, still leaving a width of two intercolumniations to the surrounding gallery. Such temples were called *pseudo-dipteral*, examples of which were to be found in the Temple of Diana, constructed by Hermogenes, and the Temple of Apollo, by Mnesthes, at Magnesia.

The rectangular plan was occasionally abandoned for the circular. Some of these structures were encircled by a single

[1] From the French of P. Planat, in Planat's "*Encyclopédie de l'Architecture et de la Construction.*" Continued from page 129, No. 753.

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row of columns, the temple being entirely open, with no cella wall. Neither was there any cover. The Temple of Serapis Figure 12), at Pozzuoli, is cited as an example of this type, which was termed *monopteral.*

In the *peripteral* style the cella was enclosed by a wall, surrounded by a range of columns. It was covered by a cupola, or *tholus*, crowned by a floral finial, says Vitruvius. Among temples of this kind we may rank the Temple of Vesta or Hercules, called the Temple of the Sibyl, at Tivoli (Figure 11).

The Pantheon of Agrippa (Figures 13, 14, 15) is a circular edifice, which may be considered as a temple, since it was

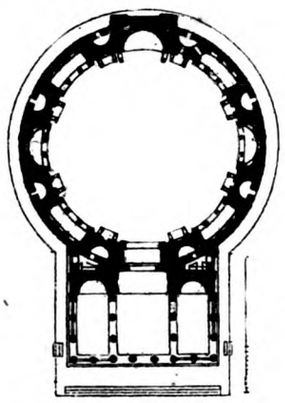

Fig. 13. Plan of the Pantheon of Agrippa at Rome (1st Century A. D.).

Fig. 14. Façade of the Pantheon of Agrippa.

placed especially under the protection of Mars Ultor, Cybele and Jupiter the Avenger. The Greeks also seem to have understood and employed this sort of construction, though no vestiges of similar Greek edifices are to be found.

The peribolus, or external enclosure of the temple dependencies, in time assumed great importance. It was adorned with columns, porticos, ædiculæ, altars, fountains, chapels and treasuries, to say nothing of the sacred grove often comprised within it.

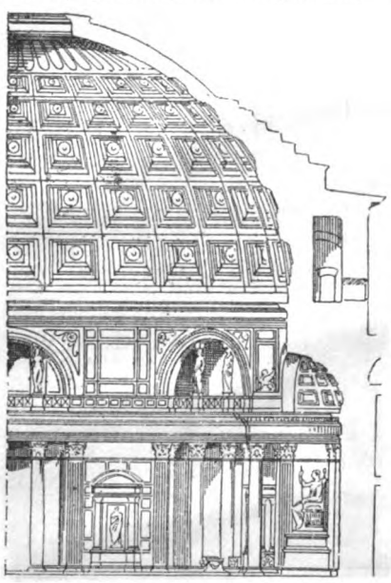

Fig. 15. Section of the Pantheon of Agrippa.

The peribolus of the Temple of Æsculapius, at Epidaurus, embraced a *stadium* and a theatre. The enclosure was sometimes adorned with propylæa or porticos, Remains of the peribolus are still to be seen in the Temples of Jupiter Olympus at Athens (Figure 4), of Ceres at Eleusis, and of Themis at Rhamnus.

Pompeii offers an example of a peribolus, on a very small scale, in the so-called Temple of Isis; the naos, raised on a quite lofty basement, stood at the extremity of a peribolus, which was surrounded by a colonnade. The peribolus of the Olympian temple at Athens was, according to Pausanias, filled with a vast number of statues of gods or emperors, and adorned with several sacred edifices; it was four *stadia* in circuit, or nearly half a mile.

The peribolus of Palmyra (Figure 10), visible in part at the present moment, was 250 to 300 feet on a side. It was bounded on three faces by a wall pierced with gates, and running around the interior of this wall were two ranges of columns, making two walks. The entrance to the peribolus occupying the centre of the fourth wall, which was otherwise solid, was formed by an exterior colonnade. The same motive was repeated on the other side of the wall; this disposition recalls the propylæa of Athens and of Eleusis.

According to Vitruvius — whose teachings must be interpreted broadly here, as on many other subjects — the Roman temples admitted of five different proportions for the intercolumniations:

Thus we have the *pycnostyle*, with a space between the columns equal to one-and-a-half times the diameter of the columns; for example, the Temples of Julius Cæsar and of Venus.

In the *systyle* the space was of two diameters: the plinths of the bases were equal to the interval between them, as in the Temple of Fortuna Equestris.

As the closeness of the columns — we quote still from Vitruvius — prevented the mothers from going up to the temple hand-in-hand, and forced them to walk in single file, which was a serious inconvenience, the *diastyle* proportion, or three diameters, was adopted, Examples: the Temples of Diana and of Apollo.

Such broad interspaces were unsafe for the architraves, which frequently broke. Therefore, when the *aræostyle* (three-and-a-half diameters) came into use, the stone architrave was superseded by the wooden beam. The aspect of these structures was heavy and clumsy. "It was, consequently, impossible to adorn the pediment with anything but figures of terra-cotta, in the Tuscan fashion, or of gilt bronze. Examples of these temples were to be seen near the Circus Maximus, in the Temple of Ceres and the Temple of Hercules, built by Pompey. Such, also, was the temple on the Capitoline hill."

The *eustyle*, which was deemed the most graceful and harmonious arrangement, gave two diameters and a quarter. "Only, the central intercolumniation, whether on the side of the pronaos (anterior part), or on the side of the *posticum* (rear wall) was of three diameters. This disposition imparted nobility to the *ensemble*, it gave freedom to the entrance and majesty to the colonnades, which served as walks around the temple." Such, at least, is the opinion of Vitruvius, whose views seem not to have been always shared by his fellow-citizens, and with less frequency still by the Greeks.

If one chooses to classify the religious edifices of antiquity according to the orders of decoration, it may be said that the temples of Pâestum, the temple of Jupiter at Ægina, the Parthenon at Athens, the temples of Apollo at Bassæ, of Minerva at Sunium, of Juno Matuta or Pietas (Figure 2) at Rome, and of Hercules at Cora, in Latium, belonged to the Doric order.

The Erechtheium at Athens, the temples of Fortuna Virilis (Figure 3), and of Saturn, after its restoration, were Ionic.

In the Corinthian order may be ranked the temple of Vesta at Tivoli (Figure 11), and of Minerva at Assisi, the Pantheon of Agrippa (Figures 13, 14, 15), the temples of the Sun and of Antoninus, of Vespasian, of Castor, restored by Tiberius, of Antoninus and Faustina, of Nerva at Rome, of Jupiter Olympus rebuilt by Adrian (Figure 4) at Athens, the temples of Palmyra and Baalbek (Figures 6, 7, 10), and, in general, all the great religious edifices reared by the emperors.

As the Roman temples were constructed after Greek models, they exhibit all the varieties noted by Vitruvius: temples *in antis*, with two or four columns, as the temples of Hercules at Cora and of Augustus at Pola; *prostyle*, with four columns, as the temple of Fortuna at Pompeii, or with six as in the Pompeiian temple of Jupiter; *amphiprostyle* temples seem to have been of rarer occurrence; *dipteral*, as the temple of Quirinus or the great temple of the Sun, at Baalbek, with double colonnades; *pseudo-dipteral*, as the great temple of Palmyra; peripteral, as the three temples erected in the vicinity of the theatre of Marcellus; *pseudo-peripteral*, as the celebrated Maison Carrée at Nîmes (Figures 8, 9).

To this last type also may be referred a large number of temples consecrated under the the emperors, with a double invocation — usually Rome and the imperial ruler; among them we may cite the temple of Venus and Rome (Figure 5), built by Adrian.

The temple of Jupiter Olympus reconstructed by Adrian, at Athens, was a *hypæthral* temple, as was also the temple of the forum of Pompeii.

The Romans, we have said, erected a certain number of circular temples: some of these were *monopteral*, as the temple of Jupiter Serapis at Pozzuoli (Figure 12); a statue was placed on a pedestal in front of each column. The Pantheon of Pompeii seems to have been constructed on the same plan. Small edifices of this kind were probably covered with a dome; the large ones were roofed with timber.

The other circular temples were called *peripteral*; a temple

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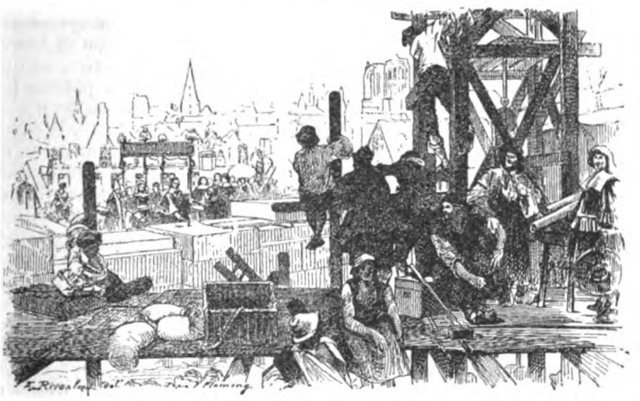
of this form existed at Rome near the Tiber, and another one at Tivoli, which has already been noticed.

In the Pantheon of Agrippa, at Rome, the pronaos with its sixteen Corinthian columns is of later date than the rotunda; it seems probable that the entrance was at first through a simple door. The interior cella was lighted from the circular opening in the centre of the dome. Near the circus of Romulus there are ruins of a temple which must have offered similar dispositions.

Lastly, we might note as examples of peculiar construction, the temples of Concord at Rome, and of Isis, Mercury, and Æsculapius at Pompeii, in which the very shallow cella was broader than the pronaos.

[To be continued.]

THE NEW SORBONNE.



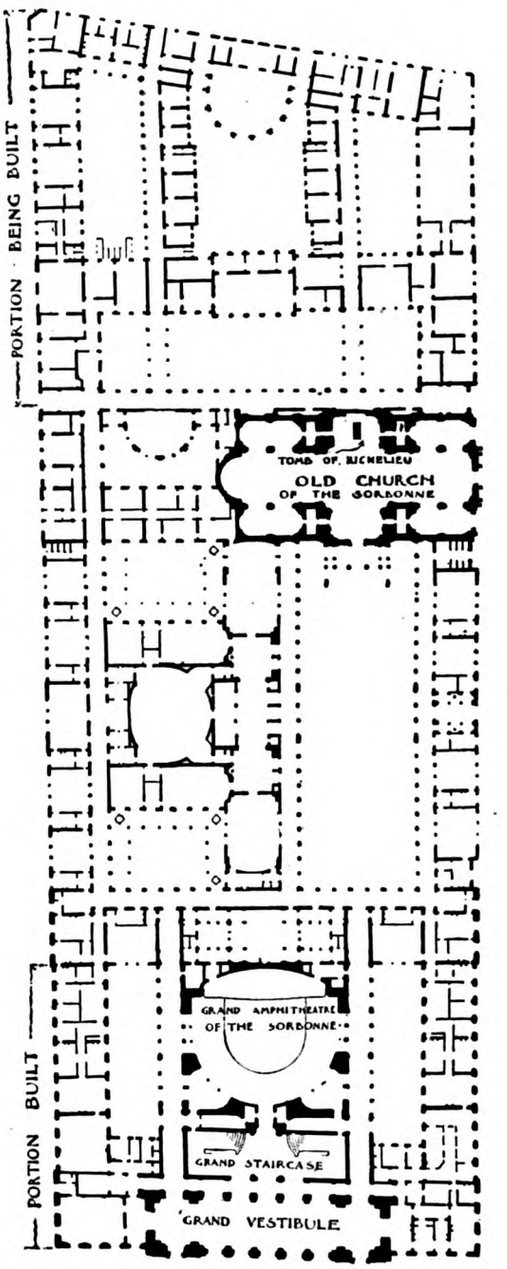
Cardinal Richelieu laying the Corner-stone of the Church of the Sorbonne. From Flameng's Painting in the New Sorbonne.

THE new Sorbonne was inaugurated the 5th of August, 1889. This inauguration took place in the hardly-finished building, which actually occupied less than a third of the buildings which will in six years, at least, constitute the real new Sorbonne. But it was necessary, apparently, to have during the exhibition a *fête* at the University for the sake of gathering there foreign students, and after that they can begin work. It is necessary to go back to 1256 to reach the date of the foundation of the Sorbonne, since it was at that time that a teacher of theology by the name of Robert, a native of Cerbon, or Sorbon, bought several houses for the purpose of establishing in them a college for poor theological students. The King, Louis IX, protected this new institution, which thus had the favor of the clergy, and soon gifts of all kinds flowed in upon it. But the establishment only received theological students. Robert de Sorbon then had an idea of founding an institution for novitiates in connection with the buildings of the Sorbonne, and this latter became the College de Calvi. In 1470 the Sorbonne became the cradle of the art of printing in France, for it was in its cellar that was set up the first printing-press. In 1622 Cardinal Richelieu enlarged the buildings, and caused the architect Lemercier to erect the buildings surrounding the large inner court-yard, and, unfortunately, these buildings will not be preserved; first, because of their scanty solidity, and next because of the lack of height of the stories, which are not even upon the same levels, and are badly arranged for new uses; but the court-yard is preserved, as well as the general dimensions and distribution, and the Church of the Sorbonne will be respected.

Cardinal Richelieu laid the first stone in the month of May, 1635, and, according to his last will, his remains were transferred thither after the completion of the church. His tomb, the work of Girardon, is still visible in the church, and forms the most interesting feature in it. The cardinal is represented reclining, one hand upon his breast, the other outstretched, and his eyes raised toward heaven. He is supported by Religion. At his feet, a female figure, personifying Science, leans upon the sarcophagus with a most lively expression of grief. Behind, two *genii* support a shield of the coat-of-arms of the minister. If one can criticise the too great barrenness of the interior of the church, it is not the case with the very elegant exterior, with its gracious *silhouette*, formed by four little bell-towers flanking the dome. This dome rivals that of the Val de Grace, and is treated somewhat in the same spirit. Both, moreover, are by the same architect, for it was Lemercier who began to build the Val de Grace after the designs of François Mansard. The church, then, will be preserved, and will be surrounded by the buildings designed by M. Nenot, the fortunate victor in the great competition which took place in 1882. The first stone of the portion at present finished, the façade of which faces the Rue des Ecoles, was laid August 3, 1887. This part of the building comprises two of the principal apartments of the designs, the grand amphitheatre and the hall of the academic council. The latter occupies the first story above an immense vestibule or waiting-room, which, on the lower floor, precedes the grand staircase of honor, or rather, the grand staircases, for we find here staircases at the right and left symmetrically placed, and giving access to the grand landing, the centre of which is occupied by an oval opening carried by a wrought-iron balustrade, through which the lower floor is lighted. This landing receives its own light through a glazed ceiling decorated with stained-glass. A glazed ceiling also lines each one of the two grand staircases. A staircase-well at the first story is surrounded with arcades, which give access to the meeting-rooms and different service-rooms. They are ornamented with very interesting and decorative paintings, in which one can follow the history of our University from its foundation; and, besides, they are otherwise wholly logical, while being quite as decorative as the grand allegorical composition of M. Puvis de Chavannes in the grand amphitheatre.

We shall find there the paintings which we have already seen at the recent exhibitions at the Palais de l'Industrie, and which we

RECONSTRVCTION OF THE SORBONNE



PLAN OF GROUND FLOOR

can now judge as a whole and in their proper place. Here are those of M. François Flameng, which form three triptychs. The first represents St. Louis bestowing upon Robert de Sorbon the charter of the foundation of the Sorbonne; Abelard and his school upon the mountain of St. Genevieve, and the installation of the first printing-press in the cellars of the Sorbonne. This is the best of the three. We have already spoken of it apropos of the *Salon* of 1887, where it was exhibited. On seeing it in place, our first impression has not been modified. The *ensemble* of the composition

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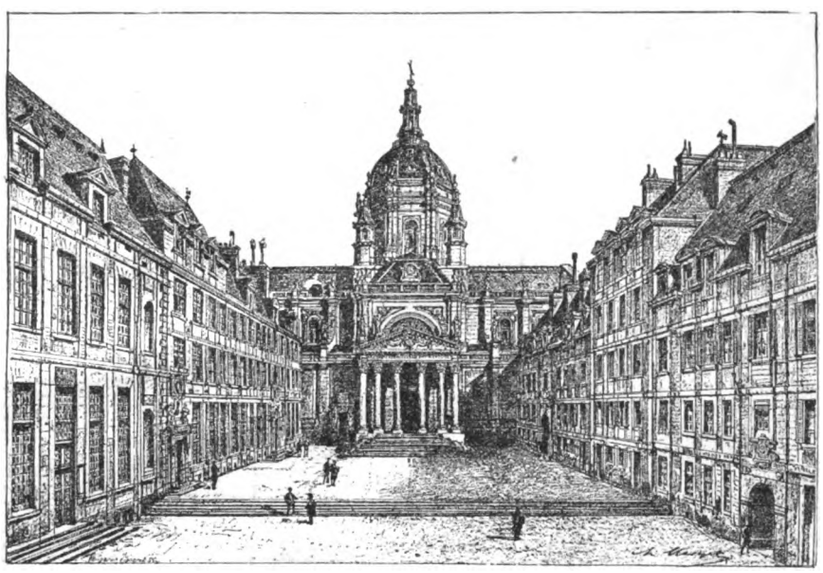
is harmonious, the background is ravishing, but the red robe of Abelard is somewhat out of keeping with the general gray and vaporous tonality of the whole painting. The centre of the second triptych represents the laying of the first stone of the Church of the Sorbonne by Richelieu. At the left, the learned doctors of the Sorbonne chat with one another. They are Etienne Dolet, Jacques Amyot, Ronsard and Rabelais. On the right are Henry IV and the rector Galland. Just as when we saw this decoration at the *Salon*, we prefer the first. In spite of this, it is still charming and luminous, even sunny, but discreetly so, and as a decorative painting which ought not to cut a hole in the wall upon which it is applied, nor oppose its brilliant coloring to the cool tone of the stonework. The third triptych is less good. The interior of the College of Beauvais, at Paris, which occupies the centre, and which shows us the figure of Rollin, the principal of the college, directing his pupils, has a disagreeable dryness, and the black robes of the personages give to the whole a too severe monotony. Happily, the motives of the two side pieces are treated in a less uniform style, which redeems in a certain measure this bad impression. But, after all, the general effect of M. Flameng's work is very decorative and of good proportion. M. Chartran, who was intrusted with the decoration of the other staircase, unfortunately gave to his figures a too great scale. At the side of balusters, of columns and balustrades, they absolutely have the air of giants. But in the execution of these paintings there is a good deal of ability obscured by apparent carelessness, as, for instance, a bit which, seen near at hand, has the appearance of being incompletely finished, at a certain distance takes on the air of being perfectly modelled for decorative effect.

Here, again, we follow the history of the Sorbonne. Just now it was the side of the University with M. Flameng, and now, with M. Chartran, it is the side of Science. His first triptych is consecrated to Louis IX, Bernard Palissy and Ambrose Paré, the latter being shown at the siege of Metz putting a ligature about an artery of a wounded *arquebusier*. This motive, which occupies the centre of the triptych, is very fine. The second triptych initiates us into the labors of Buffon, Pascal and Lavoisier, and the third familiarizes us with those of Cuvier, Laennec and Arago.

The landing of these two great staircases gives access to the central tribune of the grand amphitheatre, which has a really superb appearance, and this without tormenting ornament and without outraging decorative propriety.

Around the immense semicircular hall are arranged five two-storied tribunes, the first with stone balustrade, and the second with iron railings of a rather odd design and somewhat lacking in simplicity. These tribunes are arranged in large semicircular niches which add much to the depth of the whole, at the same time they interrupt the movement of the circular lines. Between the tribunes, in niches composed by a pediment supported on two columns, are six seated figures, representing Robert de Sorbon, Descartes, Lavoisier, Rollin, Pascal and Richelieu. The ceiling is partly glazed and is decorated in its full portion, which is vaulted in plaster on a metal framework, with five charming medallions painted by M. Galland, which symbolize in graceful female form Law, Medicine, the University of Paris, Science and Letters. These paintings, soberly treated without that pale tonality which Puvis de Chavannes has inspired in his incapable imitators, are luminous, and of a correct and yet supple design. Why was it necessary that the general harmonious effect of this amphitheatre should be compromised by the decoration which M. Puvis de Chavannes has applied to the rounded surface of the enclosing wall of the platform reserved to the authorities? What an unequalled and incomprehensible artist is this painter of the life of St. Genevieve in the Pantheon, which is a fine work, and of the "Poor Fisherman." This dull and disconnected platitude we have already criticised apropos of the *Salon* of 1887. It is a complicated and essentially allegorical and indecipherable composition, and in fact it would be impossible to guess what was represented by these different figures arranged with affectation in the foreground of a woody clearing. We have already given the explanation (see *American Architect*, No. 608). Let us only recall that eloquence, poetry, philosophy, history, science, the sea, the land, botany, geology, physiology, physics and geometry take part in this little symbolical fête. The ordinary public will understand nothing about it; but these criticisms which could be properly applied to the cartoon of the *Salon* of 1887, are not the only ones which we apply to the work of M. Puvis de Chavannes.

Why does this artist, who can design in the most perfect manner, as was clearly demonstrated by the admirable drawings in red chalk sent to the Universal Exhibition, take the trouble to show us immeasurable legs and colossal arms upon bodies of the ordinary size, since it is inadmissible that these imperfections should not be intentional. Perhaps it is these things which constitute the archaic side which the ardent admirers of M. Puvis de Chavannes discover in everything which he does, and which, therefore, excuses all the faults of the master. To this we will say that excess in everything is a defect, and we ask those who attempt this principle to explain to us how deformity constitutes that which they are pleased to call archaism. But this is not all. The coloring of M. Puvis de Chavannes, which is ordinarily rather transparent and clear, is here dull and heavy. The sacred wood which here serves as the background of the composition extends itself in a thick greenish blue mass, upon which the clearer tones of the troop of nude figures stand out too brutally. It is evident that this judgment is harsh, but in truth one is often compelled to severity by the admiration systematically declared with a *parti pris* which is so much the fashion in France to-day. Questions of art here become questions of parties, and unfortunately too often questions of politics. Now if in politics it is necessary to overlook faults of the leader of a group, we do not see the use of applying the same principle to matters of art. We have much admiration for the work of M. Puvis de Chavannes at the Pantheon, but ought we to feel because of this the same enthusiasm for his paintings in the Sorbonne? We should experience it in a less degree, since these systematic chantings of praise have as a result the encouraging of the inefficient, who seek in the imitation of an art which they deem an easy one that success which is too likely to be accorded to them.



The Old Sorbonne.

These, then, are the principal rooms of the new buildings which on the lower story serve for the administration and the staff, and contain also small amphitheatres and rooms for lectures and meetings, and on the first the grand hall of the academic council, halls for the commissioners and apartments for general use.

Work upon the buildings opposite to the part which is already finished, has now been commenced. The walls are showing above the ground. The old buildings surrounding the ancient inner court will be demolished, and this destruction and reconstruction will last for about six years, if the appropriations do not give out, and if nothing arises to hinder the regular progress of the work. To judge by the façade on the Rue des Ecoles, the new Sorbonne will have a rich and monumental aspect. This is grand architecture, a little Classic, perhaps, but without coldness or dryness. The vestibule is marked on the façade by five full-centred arches. Large windows in the first story lighting the hall of academic council are separated from one another by engaged Corinthian columns, with entablature broken around them to give support for statues. Two circular pediments, whose tympana are decorated with sculpture, crown the two bays at the ends of this central portion of the façade, which project from the curtain walls and are somewhat higher than the two wings. These two pediments, the work of MM. Chapu and Mercié, represent one, the Faculty of the Sciences, and the other the Faculty of Letters. As to the stone statues which decorate the façade, and which are about nine feet high, they have been intrusted to MM. Marqueste, Hiolle, Albert Lefeuvre, Injalbert, Carlier, Cordonnier, Suchet and Pain, that is, the very élite of the artist world are collaborating with M. Nenot in the decoration of the Sorbonne.

Among the painters, besides those whom we have already mentioned, we name MM. Benjamin Constant, Lerolle, Wencker, Cazin, Lhermitte, Roll, Raphael Collin, Duez, Merson and Clairin. The new Sorbonne, therefore, will be a true museum of art, which will mark the progress of painting, sculpture and architecture at the end of the nineteenth century.

Brussels to be a Seaport. — It has been decided to make Brussels a seaport, by means of a canal capable of admitting ships of 1,000 tons. An English syndicate has accepted a contract for the work. — *Boston Herald.*

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BRICKMAKING IN AMERICA.

"All the Modern Improvements."— No. II.

ANY ONE paying his first visit to America cannot fail to be impressed with the business energy and enterprise of its people; and looking abroad, and considering what it is that inspires this, the cause is very apparent. In America it seemed to me to be the ever opening up of new resources which excites the energies of the people, and spurs them on in untiring industry. These resources are also as varied in their character as in their richness, so that, whatever branch of industry is considered, the same tempting bait is offered. The branch of industry in which I was more especially interested was that of bricks and kindred manufactures. The leading building material almost everywhere in that country is brick. Granite, marble, and building stone of good quality are abundant, but they lie remote from the cities generally, while excellent brickmaking material is almost everywhere abundant. One peculiarity of this material as compared with that in our own country is that it is almost everywhere of the same character, viz., a loamy material; but it contains sufficient alumina to make a sound and strong brick. It will admit of a thorough firing, and comes out a bright red color. Around Philadelphia and all the way to Washington, and around St. Louis, are found, perhaps, the richest clays; but the districts where brickmaking material is not found are very rare indeed. In the neighborhood of Chicago the clay is weaker and stony, and produces an indifferent brick; but in the State of Indiana, and not far away, is again found clay of good quality, and, notwithstanding the rapid expansion and growth of that city, I found that the bricks were sold there at much less price than in any other part. Again, in Canada the same characteristic of the clay prevails; and coming round again across the St. Lawrence, and all through Maine, Massachusetts, to New York, New Jersey, etc., and also in those States lying between, is found the same. The peculiarity of prevailing sameness to me was most remarkable, accustomed as I am to such variation as is everywhere found in England. In those districts where the best clays prevail, the manufacturers are to be commended for the excellent quality of the bricks which they produce. Those used for facing buildings are as perfect as they can well be, both for density, form, and color.

The best facing bricks are generally produced by handwork. The Americans in their brickmaking are ahead of us in some respects, and in none are they more so than in their careful preparation of the clay before it is made up into bricks. It is usual with them to dig and heap it up for a thorough weathering; then in using it is tipped into what they call a tempering wheel-pit. This is about 3 feet deep by 24 feet in diameter, and is filled level with the surface with the clay, water is sprinkled over it as required, then the tempering wheel is set going. The wheel is about 5 feet in diameter, and consists of two or three rims of iron, of about 1-inch section, which are tied together 1 inch apart, and form one wheel. The cavities between the rims give them an increased kneading effect. The wheel is supported in the boss by an iron arm, which extends to the outer rim of the pit, and is drawn either by a horse or by power. The wheel works loose on the arm, and as that is drawn along the wheel revolves in the clay, cutting and kneading it as it travels through it round the pit, and by an ingenious arrangement is made to cover every part of it, and change its course at every circuit from the inside of the circle to the outer, than back again to the inside, and so continue without any attention, never going more than one round in the same groove. It is allowed to run thus for twelve hours, when the clay, after having been patted and smoothed over the surface, is allowed to remain over night, and the next day it is mellow and in good condition for being moulded into bricks either by machine or by hand. The pit holds sufficient clay for 20,000 bricks, and two or more pits with their wheels are required to keep a yard going, according to its size. The plan is purely American, and it would be rather interesting to know the origin of it. The tempering is certainly done very thoroughly by it, but it might be done equally well with greater economy.

The superior character of the clay which prevails generally gives one very little difficulty in dealing with it in any of these processes. There is very little hand-moulding, and machinery is almost everywhere in use. The Americans have what they call three classes of brickmaking machinery, viz., the mud, the stiff clay, and the dry. The mud or soft clay process is most generally in use. In this process the clay is usually prepared by the tempering-wheel, and in some cases by shovel and hand tempering. It is then supplied to a vertical square pug mill. At the bottom of this is an arm or wiper, which forces the clay into a chamber situate on the outside of the pug mill, but attached to it. In this a plunger works vertically. Six bricks are made at once, and the moulds are formed in one frame, which is placed in position by hand, so that an arm in the machine can push it under the plunger to be filled. This forces the clay into the moulds; the empty mould in being pushed into position for filling pushes forward the one previously charged ready for being taken away, and is emptied on to a pallet which is placed on an incline on a circulating disc holding several pallets. These are then lifted on to a wagon, the pallets containing the bricks being placed one upon another on a wagon holding 500 bricks. This is then run into a drying-chamber, and, after remaining there for twenty-four hours, is ready for being set in the kilns. The moulds have bottoms in them, and are sanded for the double object of enabling the bricks to leave them freely, and to leave them sanded over the surfaces. An ingenious method is adopted for sanding the moulds mechanically. This machine is capable of turning out 40,000 bricks per day, but 25,000 is the usual day's work, and in Canada 12,000. The slower the machine is worked, the better is the quality of the brick produced. In Canada a very good brick is made which is used for facing work without repressing, as well as for ordinary purposes. This process is the nearest imitation of handwork, and is almost everywhere in use. This method has undoubtedly advantages. There is a saving over hand-moulding, and the bricks so made are quite as good; and in stony clays, where for making ordinary bricks it is not necessary that they should be either crushed or cleared out it is a useful process, and the machine takes little power and gives little trouble, and it seemed to me that it might be adopted in the London stock brickyards with considerable advantage. But as it is employed in America most generally it would, no doubt, be greatly improved upon in respect of economy in brickmaking, and without any deterioration in quality.

The stiff clay process is by the pug mill and wire-cutting method. There is in the country a very great variety in the machinery of this type, and each with varying merits. Both vertical and horizontal machines are employed. Some of these are small, and others excessively large; but it seemed to me that the designers of the whole of them had failed to comprehend the actual requirements of brickmaking. There are several machines which combine the vertical with the horizontal type, but for what good purpose it is difficult to understand. Good work is done by perhaps all the machines; but it is done with much waste, both in wear of machines and power taken up in driving. There is one machine, of which I saw several in use, which I thought to be the best. It turns out a large quantity of bricks, but they are of the roughest quality, and are only used for inside work. Considerable advantages are claimed for this machine, the specially valuable feature which is claimed for it being its automatic cutting off, but the quality of bricks made by it would not be used for any purpose in this country, and we greatly excel it in many respects, the foremost being in quality, in amount of power it takes, and in wear, and the advantage in the automatic cutting off is also more apparent than real. America, with all its genius for invention, and its variety of brickmaking machinery, has yet something to learn from the old country.

There is perhaps quite as much variety in machinery for the dry brickmaking process as for the stiff clay, and I cannot speak too highly of much that I saw of this class. There are several notable failures which were accountable for a vast waste of capital, of which I saw several instances that confirmed my unfavorable view of them. One serious defect, which I noticed in all alike, was the extreme porousness of the brick made by this process. The method adopted for charging the moulds in all the machinery of this type alike is responsible for this. The clay in many parts is specially favorable for making bricks by the dry process; and if the Americans would adopt the plan of re-pressing the bricks as they come from the machine they would be very much improved in this respect. There is an entire absence of our semi-plastic process being employed in those materials which are being worked on the dry plan; very superior results as to quality might be produced by this. In the methods adopted for brick-drying American brick manufacturers are much in advance of us. Artificial drying-chambers are almost everywhere adopted. The plant for this, in the first instance, is expensive, but the cost is recouped many times over in the great saving in labor in permanent working. Various methods of heating the chambers are adopted — some with fireplaces, others with pipes heated with steam, others hot air, and, again, with fire fumes passing through the body of bricks. All these methods are more or less successfully employed. Ordinary drying-floors, which involve labor in the bricks being put down and taken up again, are not in favor. The excellent character of their brickmaking material favors them here again in allowing the bricks to be rapidly dried, which is generally performed in twenty-four hours.

In their methods of burning their bricks I consider the Americans much behind us here. The Hoffmann kiln, I believe, has no existence there as yet, or even any of the greatly improved methods of

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burning; the old-fashioned open case is everywhere in use. There are a great many so-called patent kilns, but the alterations from the most ancient type is almost without a difference, and in some cases are a decided deterioration from the original. Very great improvement might be made in their method of burning, and I was much surprised to find that they had been so slow to realize this.

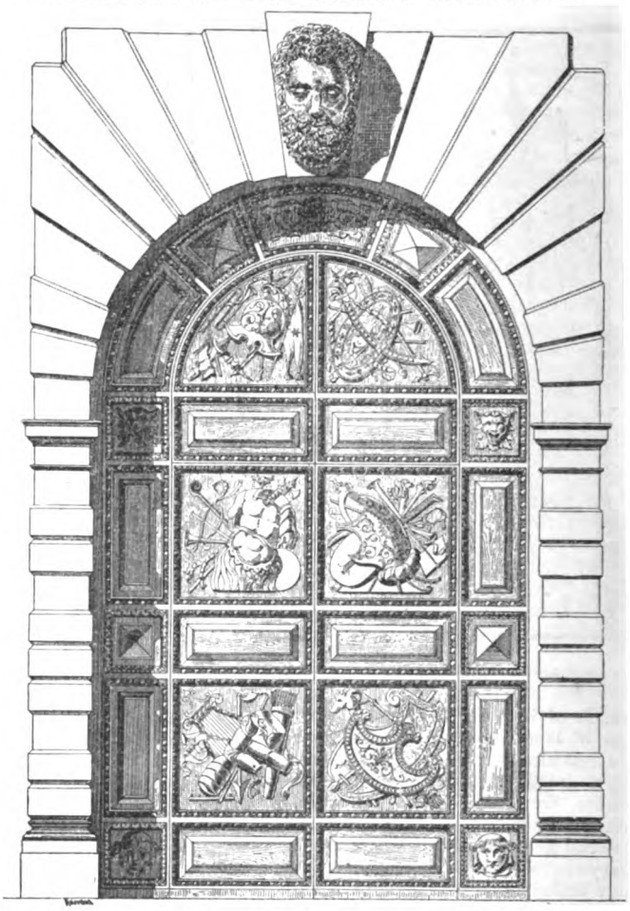
In sanitary pipe manufacture the Americans are fairly well abreast of ourselves, and in some respects I must allow them to be in some measure ahead. They prepare the clay well, and are alive to the saving of labor in the detail of the manufacture. Too much cannot be said of their fire-brickmaking. This is universally carried on by handwork. In preparing the clay the tempering wheel before referred to is employed, and in some instances the solid bottom edge runner mill. In Pennsylvania they are somewhat ahead of other parts, both in their mode of manufacture and in burning. They are slow to realize the advantage of employing machinery in this manufacture; but in this there is little to boast about even with us. In Scotland they are just beginning to realize that equal results with hand labor are to be obtained from machinery, and with a great reduction in cost of manufacture, and machinery is now becoming adopted, and is increasingly inquired about. The Americans are also beginning to awake to the advantages which are to be gained by the use of machinery. One firm in Massachusetts has put down a model fire-brickmaking plant in which machinery is fully employed, and also a greatly improved method of burning, and their example will no doubt be largely followed by others by and by, for the Americans are quick to adopt improvements and economical methods as soon as they become convinced of their genuineness. I specially noticed the poor quality of the white and buff building bricks, and the almost entire absence of the manufacture of white and colored enamelled bricks. There is an abundance of material that is suitable for all these; but as yet the manufacture in them is very limited, and the few that are produced are of very inferior quality. I found that this class of bricks is largely imported from England, and the trade in them might be largely increased if the English manufacturers were more alive to the openings there are for trade in this direction. The difficulty which the Americans have to obtain them makes the use of this class of brick very limited, and I noted a very earnest inquiry among the brick manufacturers in the country to be enabled to produce them. If English manufacturers would cultivate this trade, I saw sufficient to convince me that they would find a demand equal, perhaps, to the whole production of this country. The Americans say they do not use them for the simple reason that they cannot be got, not because they are costly, although the tariff added to the original cost here makes this considerable, but the complaint is that they are unable to obtain them. Silica or ganister bricks seem to be entirely unknown in the country so far as their manufacture is concerned. The Americans have the natural material, but as yet the manufacture has no place in the country; but there is an inquiry for this class of brick which should enable the Americans to produce them.

I noticed the pottery branches were fairly well developed. An excellent quality of terra-cotta goods is manufactured in the neighborhood of Boston, but this is not nearly so largely developed as there is clearly a scope for in this class of goods. Pottery ware is produced, but the country is still largely dependent upon importation for the best ware. I had noticed previous to my visit a boasting that in this branch the Americans were leaving Staffordshire in the rear, but in my observations I failed to find evidence that they were at all near in the race. I noticed much pottery ware that was very fine, for the Americans possess considerable artistic taste and an eye for the beautiful, of which I saw abundant evidences, but for the gratification of much of this they are dependent upon England, and perhaps in nothing more than in pottery ware.

My observations extended to many other branches of industry, but as I was more especially interested in those referred to in these notes, and therefore gave particular attention to them, I found the opportunity most valuable in obtaining information and also many useful hints, which will no doubt be taken advantage of at the proper time. — *W. Johnson, M. I. M. E., in the Architect.*

Defacing Public Monuments. — News comes from London that an Englishman has been prosecuted for having inscribed a name upon the battlements of Guy's Tower. This offence, coming as it does close upon that of the vandals who recently broke off a part of the wreath from the bronze statue of Giordano Bruno, at Rome, renders the prosecution doubly commendable; and it is to be hoped that it will be the means of putting an end to the very vulgar and senseless practice which many make of defacing buildings and monuments. There are, however, two palliating circumstances connected with the present case. One is that it has a royal precedent in Queen Elizabeth; *vide* the famous verse scribbled by her upon a window-pane; and the second is the halo of romance which is lent it by the fact that it was his lady-love's name which the sentimental cockney inscribed upon the battlement. Leigh Hunt tells us that when we see "John Jones" cut on a bench or a tree, we are not necessarily to set it down to vulgarity, as it may be "the natural desire to achieve such immortality as may be within his reach." How much more pardonable, then, is a man who seeks this immortality, not for himself, but for the object of his affection! — *N. Y. Tribune.*

M. BERGER ON THE CHICAGO EXHIBITION.



Palace-door at Trent, Austria.

THERE is certainly nobody better qualified to advise the promoters of the coming Exhibition at Chicago than the principal director and organizer of the past Exhibition at Paris, and the suggestions which M. Berger has made to that end in the April number of the *Century Magazine* will be read with attention by all interested in exhibitions, past and future.

As, while indorsing many of M. Berger's ideas, there are some which I think are certainly open to criticism, I venture to ask the opportunity of commenting in the pages of *Engineering*, the journal *par excellence* of exhibitions, on some of his proposals. My friends in Chicago will absolve me of any desire to offer them unasked advice, since the subject is one of importance, not alone in reference to the next great international exhibition (I hope we are not to be obliged to call it a "fair"), but in connection with the future organization of exhibitions generally. No time can be better for the general discussion of the matter than immediately after the conclusion of so successful an experiment as that in Paris.

To begin with, M. Berger will hardly expect us to admit his preamble, or to allow that in the Paris Exhibition of 1889 the idea has culminated, and that nothing equal is possible. The proposition is excusable, and so far justifiable that it cannot well be disproved, before it is, in the nature of things, forgotten, but it may be left without contradiction for courtesy's sake. Let us each hold our own opinion. Personally I prefer to regard the Paris Exhibition as a grand lesson, teaching us how we may do better over here when we can make up our slow-moving minds to try, and showing us a few points to avoid, as well as, be it admitted in all honesty, many that we shall do well in not attempting to rival.

There is no city in the world, old or new, so attractive to visitors as Paris, none so hospitable, none so ready to receive strangers within her gates, and for due consideration, to entreat them well; none therefore, so fitted for a "World's Fair" of amusement and entertainment, none to which foreigners from all the world (but chiefly from America and England) will so readily flock.

No exhibition in London would draw the same crowds. It seems to me absolutely unreasonable to expect that one in Chicago could; but with that exception, and that exception alone, there is certainly no reason why an exhibition in London or in Chicago should not be as much, in certain qualities, superior to Paris, as Paris, in certain qualities, was superior to her predecessors.

Now, in my opinion, one of the great wants of the Paris Exhibition was open space. The limited available area, and the way that area was divided, were the great difficulties in the way of those two able administrators, MM. Berger and Alphand. The manner in which they overcame those difficulties was the great proof of their ability. Two separate plots of ground, connected by a long roadway, with a

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third cut off by a broad river and two roads, do not, as a whole, form the best possible site for an exhibition. Could buildings such as those of 1889 be arranged round a large quadrangle of garden-ground, larger than that of the Champ de Mars, with a surrounding space of park or garden in which separate pavilions and annexes could be erected, that would be my ideal arrangement for an exhibition, and with the abundant spaces of Chicago it might well be realized there. The mean surroundings of the Paris Exhibition, their closeness to the buildings, and the want of an impressive entrance, sadly damaged the general effect, especially the external effect. As to the buildings themselves, nothing better need be desired than the grand Palais des Beaux Arts and Arts Libéraux, with their convenient covered arcades, in which crowds found room for passage in either wet or sultry weather. The ample galleries in which the industrial products were shown were well suited to their purposes and well constructed. The great Machinery Hall would perhaps have been better applied to some other purpose than the exhibition of machinery, and was certainly for practical purposes needlessly lofty, but its effect was magnificent, and it also must be regarded as an example to be followed. The arrangements of restaurants on the ground-floor of the buildings surrounding the gardens, was admirable, and should be imitated in future.

The various buildings in the Esplanade des Invalides were too numerous and too crowded, consequently they lost much of their effect. Yet how could this be helped? The fact is an exhibition on the scale of that of last year should have for itself the area of a fair-sized town, and should be laid out as the American founder can lay out a future city, independently of surrounding owners and inhabitants.

M. Berger lays stress on making buildings of a permanent character. This is very nice, if it can be done, but it is a costly method of setting to work, and I believe the very heavy outlay is not justified by the return. If indeed the buildings as they stand can afterwards be utilized, and if their future application is not allowed to effect their arrangement, it may be an economy to build permanently, but I cannot see much force in M. Berger's contention that an architect who puts up merely temporary buildings will "lessen greatly the chance of making afterwards remunerative sales of the building materials or of organic parts of his structures."

It is a difficult question how far concession is to be made to the popular desire for mere amusement. If the concessions do not go a long way, the Exhibition, however valuable and complete, will be a popular and a financial failure. "The Exhibition must be full of gaiety and liveliness, yet it must avoid anything that might impress upon it a trivial character — anything that savors of the circus or variety show." How far Eastern dances, "vanishing ladies," and cafés chantants come under this definition, I am not concerned to decide, but I cannot believe the French Exhibition would have been any the less successful if the amusements had been of a little higher tone, and the executive supervision a shade more severe. Over here we were contented with music, and the evenings at South Kensington were popular enough. But amusements the crowds must have. It is preposterous to suppose people will crowd to an exhibition without it. Let it at least be as good as it can be made, something better than is provided by the average local music hall. Perhaps the inventive genius of America may provide us with an alternative to the South Kensington illuminated fountains, the greatest recent novelty for the entertainment of crowds.

It is very satisfactory to see that his experience has converted M. Berger to a true view of the value of exhibition awards. In the early days of the Paris Exhibition I tried hard to convince him of the objections to them. He silenced me with the remark that he did not think any of my colleagues, the other foreign commissioners, would agree with me. I dare say he was right. To suggest to our own exhibitors that they should agree to put the British Section *hors concours* seemed too strong a measure, and, when awards were made in other sections, not desirable in their own interests; but I am sure I should have been supported by a large majority of our exhibitors in any proposal to abolish medals altogether.

M. Berger's opinion on this head ought to, and must carry great weight. If I may be permitted to indorse it, I do so most heartily.

In the same section of his article he suggests that "the formation of national sections should be abandoned." This idea, I fear, though good theoretically, is in practice but a counsel of perfection. Foreign exhibitors must have somebody to look after them, to represent them, to fight their battles. It was at first proposed to work the French Exhibition on this plan, arranging all exhibits by subject-matter, and disregarding nationalities entirely, but the notion was abandoned at a very early stage. As it was, the subdivision of the British space into five different sections, located in widely separated parts of the grounds, added enormously to our labors, and greatly increased our expenditure. Worse than this, it placed us at a disadvantage with other nations, and especially with France. Nobody really appreciated how considerable were the contributions of Great Britian, because nobody except the executive, really knew where all the scattered contributions were to be found. On the other hand, it is fair to say that the only "international" section, that devoted to railways, was well organized, and I believe our exhibitors were as well treated as their native competitors. That the alteration would be full of difficulties is certain. It does not seem to me as sure that if it could be carried out it would be wholly advantageous. Visitors like to see the various foreign sections, Russian, Spanish, Dutch, Norwegian, etc. Each represents more or less a bit of its own country transplanted to the middle of a foreign land. The foreign visitors love to look at their own country's productions, to see their own folk, to hear their own tongue. On the other hand, natives equally take pleasure in seeing the examples which foreign countries have sent over to their own country. These popular advantages would scarcely be compensated by the more scientific value of collections of similar articles from different parts of the world, and the opportunity given to experts of close and careful comparison of adjacent products.

That no rent should be charged for space is certain, but I hold that there is not much difference in levying a rate on exhibitors for flooring, decorations, blinds, and maintenance, as was done in Paris, and in charging a rent for space. It is well-known that our British Committee was obliged to raise funds by charging exhibitors a rate or rental assessed on the amount of space occupied, and in very many cases I know that the amount thus charged did not greatly differ from the amount charged to French exhibitors, even making allowance for those instances in which the show cases were provided by the French departmental committees.

I know of no other way in which, when no Government grant is made, the expenses of a foreign section can be met, but I think a foreign section has a right to expect that they will be spared all expenses of construction, and that they should find the courts allotted them absolutely complete and ready for occupation. Had this been the case in Paris we could safely have reduced the charge made to exhibitors. In any future section, worked on this principle, I would recommend a sliding scale of charges, calculated on the amount of space occupied, and giving an advantage to exhibitors taking large spaces.

The question of sales is another thorny one. The French executive very properly announced that sales were absolutely prohibited, yet they entirely failed in stopping them. The worse offenders were, I think, amongst the foreigners, and naturally it was more difficult to put pressure on foreigners than on natives. As regards the British Section, I told exhibitors that so long as sales were not allowed elsewhere, they would not be allowed in it, but how was it possible to interfere when exhibitors in all the surrounding courts were selling their wares without let or hindrance? At the same time I should have liked our exhibitors to set a better example in this respect than some of them did.

A strong executive, determined not to allow selling, could stop it, and I think that the executive of any future exhibition ought to lay down and to carry out stringent rules for its prevention. The only case in which sales are excusable is when articles are manufactured in the building to illustrate the working of a machine. Even this should only be allowed under special permit.

As regards price of admission, a franc, or a shilling, or 25 cents may be looked on as the regular thing. Doubling the entrance fee after a certain hour is an unsatisfactory and irritating arrangement. The plan of raising the price on certain fête days seems a fair one, but that of making a considerable addition after a certain hour on such days is naturally futile, as everybody comes in before the specified time. To my mind the English plan of one day a week at a higher price has much to recommend it. It helps to sell season-tickets, it gives a good opportunity for those who really want to study the exhibition, and it affords convenient occasions for exhibitors (exhibitors of machinery especially) to do business. Of course, the nominal price should be the actual one. To put a mass of tickets on the market in such a way as to insure their being sold at a discount of 50 to 90 per cent, does not seem a satisfactory financial operation.

As regards classification, perhaps everybody thinks their own plan the best. M. Berger is enamoured of his. It was very elaborate and severely logical. It seemed to me to have faults. One would not look for pins and needles among metallurgical products, though such they certainly are. Why aërated waters and drain pipes were classed together I could never understand. There were certainly practical inconveniences in putting agricultural machines in one group and steam ploughs in another. It was hard to know whether to advise a gunmaker to enter under Class 38 for firearms or Class 66 for guns, and so on. But it is easier to criticise than to construct. Suffice it to say that there are now in existence a sufficient number of exhibition catalogues, on sufficiently various systems, to afford models for imitation and avoidance for any number of future exhibitions. Perhaps Chicago may adopt the Philadelphia classification of 1876. It is a thoroughly practical one, admirably suited for its purpose, which is to provide for the convenient arrangement of exhibits, not to present a logical sequence of abstract ideas.

The suggestion that each foreign section should prepare its own catalogue in the language of the country, uniform in size and type with that of country holding the exhibition, seems a good and reasonable one. Nor is a year too long beforehand to demand catalogue entries, provided opportunity is given afterwards for revision. But the promptitude with which a catalogue comes out depends on the executive and their printers more than on the exhibitors. In English exhibitions it has always been a point of honor to have the catalogue ready on the day of opening, and this precedent was followed at Paris, where the catalogue of the British Section was the only one in the building on the opening day and for some time after. Greater accuracy is insured if a second edition if published, say two months after the opening.

I certainly do not agree that exhibitors should be made to pay for their catalogue entries, or even for additional lines. In fact if the

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executive can afford it, it would be better to omit all advertisements whatever and to make the catalogue purely official, as was done with the catalogues of previous British sections when they were subsidized by Government. The size of the catalogue is important. It should be as small as possible. Crown octavo, as at Glasgow and in our sectional catalogue at Paris, is the best size.

M. Berger advocates, somewhat strongly, the holding of Conferences in connection with international exhibitions. The idea was of earlier origin than he says, for it certainly is as old as the Loan Exhibition of Scientific Apparatus, held in 1876. Special congresses held in connection with special exhibitions, such as that of electricity in Paris in 1881, are of great value, and any meetings of the kind have their use in bringing together the specialists of different nations. Whether as a rule they are good for much more is doubtful. The best congresses at Paris were the meetings held by societies such as the French Ingenieurs Civils, the English Society of Electricians, etc. I believe that the most practical way of carrying into effect the ideas put forward by M. Berger is by inviting the chief societies and institutions of the country, scientific, professional, artistic, to hold each a meeting at the Exhibition, affording them all possible facilities, and providing them with the means of inviting eminent foreigners. The success of the visit to Paris of the American engineers is a case in point. Congresses do not attract the general public. A more popular feature would be illustrated lectures, such as those given at the Colonial and Indian Exhibition.

One of the greatest needs of exhibitions now-a-days is condensation. They are too big. They want cutting down. I would try and encourage collective exhibits; exhibits illustrating the productions of a town or a district, or the condition of a special trade. Is it too much to hope that at the next great Exhibition, Sheffield might be represented by a carefully selected collection of her best cutlery, Manchester by the finest possible samples of cotton goods, Birmingham by a series of her manufactures? Or why should we not have a joint exhibit from the English cotton trade, another from British ironmakers, and so on? It is not only the individual exhibitor who reaps benefit in a foreign exhibition, it is the trade he represents. I must allow that such an arrangement would much increase the difficulties of organization, already quite sufficient, but that is no reason why an effort should not be made.

With regard to the special question of the likelihood of large numbers of foreign exhibitors going to Chicago, M. Berger's views are encouraging. He hears many of his compatriots expressing their intention of taking part in the Exhibition, and, as he says, "What people are saying in France they will soon be saying everywhere." Even as a general proposition this statement has some truth in it. As a particular instance I believe it is correct. No better augury for the success of an American exhibition need be desired than the promise of a good French Section, especially, may I be permitted to add, if that section is so fortunate as to have M. Berger at the head of it. As to our own countrymen, of course they will grumble and say they will not go. Then they will all come in at the last moment, find there is no room, and — grumble again.

I have no fear as to there being a good British contingent at Chicago, but I do earnestly hope that we may have a Commission under Government authority, and though this is not so absolutely essential, endowed with a moderate Government grant. The country ought at all events to give enough to allow of all the contributions of the industrial exhibitors, direct and indirect, being expended to their advantage alone. — *H. Trueman Wood, in Engineering.*

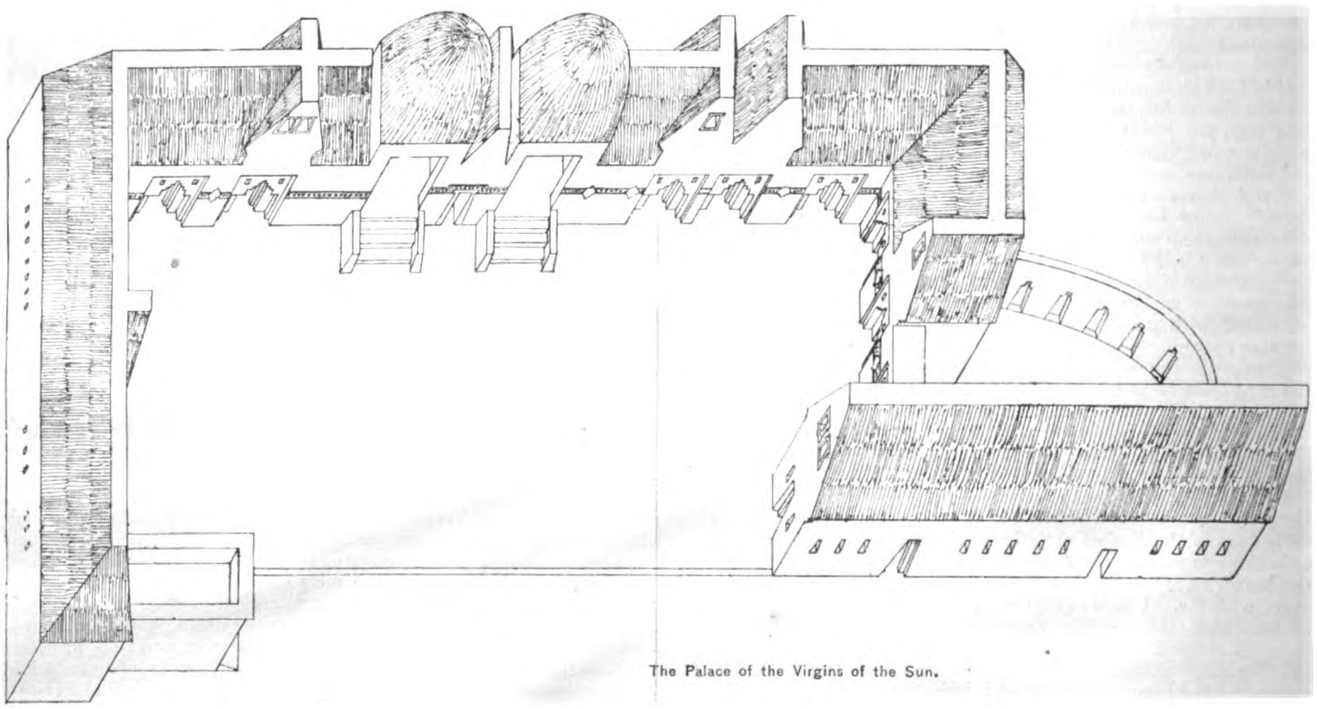
THE PALACE OF THE VIRGINS OF THE SUN, COATI, PERU.

EXTERNAL PULPIT AT SAINT-DIÉ

THE remains of the Palace of the Virgins of the Sun on the Island of Coati, Lake Titicati, Peru, are among the most interesting specimens of Inca architecture in that country. The accompanying restoration has been compiled from the descriptions and illustrations by the late E. George Squier in his book, "*Incidents of Travel and Exploration in the Land of the Incas,*" supplemented by some unpublished scale drawings and photographs loaned the writer by Frank Squier, Esq., to whom especial thanks are due for the aid he has given. The following description is condensed from Mr. Squier's book:

The Palace or Temple, as it might be called, is situated on the northern side of the island, about midway of its length. It occupies the upper of a series of seven terraces supported by retaining-walls of cut and uncut stones. The structure is built around three sides of an oblong court, 80 x 183 feet. The material is stone, roughly broken into shape, laid in tough clay, and carefully stuccoed. Of the thirty-five chambers in the lower story, only one is faced with hewn stone, and this seems to have been a kind of secret chamber, approached through a narrow, arched passage. The only attempts at architectural ornamentation are on the façades facing the court, and consist of lofty and elaborate niches. Each niche is in the centre of a kind of stucco framework, or panel. The walls are further relieved with windows and ornamentation devised so as to admit light without outwardly indicating that they do so. Further variety is furnished by placing the lines of the cornice over the entrances higher than elsewhere, thus making a distinction between them and the blind doorways. The cornice, of three layers of stone, projects 18 inches. The exterior was painted yellow, with the exception of the niches and the undersides of the graduations of the cornice, which are red. The building was of two stories, or, more properly a story and a half. The roof was pitched almost as sharply as Dutch roofs. It was not parallel to the façade through its entire length, but was broken by gables.

The floors of the upper apartments have disappeared, having



The Palace of the Virgins of the Sun.

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evidently been of wood. The ledges, or sets-off, in the wall which supported them are plainly marked throughout; and there are similar ledges on the inner faces of the gables, with projecting stones on which to rest and fasten the roofs. The places in which the ridge-poles were inserted are still distinct. The upper story probably coincided very nearly in plan with the lower, and was reached by stairways of cut stone, some of which are still perfect.

The apartments were connected with each other by doorways, opening directly through the partitions, or sunk in the side-walls. To reach some of the inner apartments it was necessary to pass through several exterior ones. Every door opening on the court led to its own special and separate system of chambers. These were variously lighted; some by means of small windows opening on the court where they were masked by the ornaments of the façade, and others by means of windows opening through the exterior and unornamented walls, marked on the inside by niches. Every gable was pierced by one or two large windows, narrow at the top and broad at the bottom. There is, among the remains, a single small apartment, faced with smoothly cut stones, to which access is gained through a vaulted passage 20 feet long and 8 feet high. There is a small opening into this, only a few inches square, from an outer room or cell, evidently not intended for the admission of light, and which seems designed to permit verbal communication with the interior.

The salient features of the buildings, however, are two chambers or rooms, 20 feet long by 12 broad, entered from the centre of the principal façade, not through doorways such as have just been described, but through broad openings, 15 feet wide. The ground or floor within them is raised four feet above the level of the floors of the building generally, and is reached by a flight of stone steps. Within, and directly in front of the entrance, there is in each room a great niche, countersunk in the wall, which is here very thick. In style it is similar to those ornamenting the façade. Two small niches are seen at each end of the apartment. These rooms, which appear to have been much loftier than any of the others, and to have been surmounted by pyramidal roofs, have no communication with each other, or with any of the other apartments. They were probably shrines, and may have contained statues or *simulacra* of the Sun and Moon. The entrances do not appear to have been closed save, perhaps, with a veil of cloth. Between these two chambers is a smaller apartment, entered by a narrow door. The view is cut off by a curtain or traverse wall, behind which is a kind of dais in stone, with a platform in front of it.

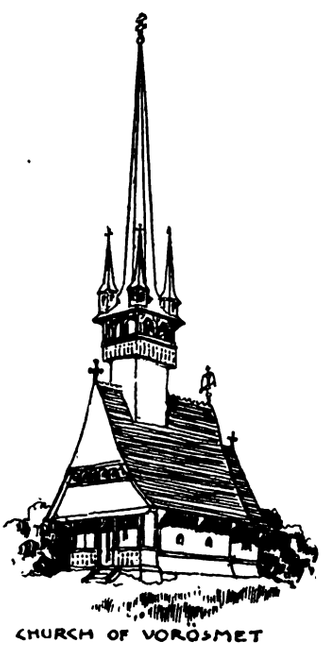
Facing the convent, we find, behind its right wing, a court bounded by the building itself in part, and in part by a semi-circular, niched retaining-wall, conforming to the sweep of the amphitheatre in which the convent is built. It is entered from the terraces which curve around the heights, by a principal passage between two plain buildings, dependent, however, on the general structure. It was here that the sacred vicunas and llamas were kept, from the wool of which the mama-conas, or vestals, fashioned their own garments, those of the royal race, and the hangings of the temples. It is impossible to describe the beautiful but complicated series of terraces which fall in harmonious graduations from the court of the convent to the lake. The retaining-front of the second terrace below the court of the convent is of cut stone, admirably fitted, and along its top runs a wall of stones, breast-high — a kind of parapet or balustrade, pierced at regular intervals with openings, shaped like the niches in the building itself, through which may be seen the waters of the lake. Two stairways, countersunk, if the term may be used, permit descent to the terrace below, whence curve out flank terraces terminating on rectangular platforms, which, perhaps, sustained structures as light and temporary, if not as tasteful, as our summer-houses.

In the accompanying restoration large dependence has, necessarily been placed upon this description, as well as upon the plans and sketches of similar edifices in Mr. Squier's book. The haystack-like domes over the two central apartments are modelled after the dome of the Sondor-huasi, at Azangaro, which has retained the original thatched roof for more than 300 years. This building is circular, but there is every reason to believe that the domes of Coati were similar in construction. The dome of Sondor-huasi is formed of bamboos of equal size and taper, the larger end resting on the top of the walls. They are bent to a central point over a series of graduated hoops also of bamboo. At the points of intersection the vertical and horizontal bamboos are bound by fine cords of delicately braided grass. On this skeleton is a fine mat of the braided epidermis of bamboo or rattan, without seams, and which may have been braided in position. It is worked in colors and panels conforming with the spaces between the frame-work, which is itself painted. An open and coarse matting fastened with a fleece of finest ichu, depending like a heavy fringe outside the walls, is placed over this. Then comes a transverse layer of coarse grass or reeds, then ichu and so on, the whole forming a slightly flattened cone. The projecting ends of the ichu layer were cut off sharply and regularly, producing the effect of overlapping tiles.

Cieza de Leon describes the roofs as an eye-witness, thus: "They are of straw, but so artfully laid on, that, unless destroyed by fire, they will last many ages." Mr. Squier presents a translation from Garcilasso, which bears upon this point. It is as follows: "Their roofs were made of poles fastened to each other transversely by strong cords. These supported a layer of grass of the thickness in some houses, of six feet or more, which not only served as a cornice to the walls, but extended beyond them for more than a yard, as a pent-roof to keep the rain from the walls, and to shelter the people beneath it. The part that projected from the wall was clipped off very evenly. I remember a structure in the valley of Yucay, of the kind I have described, more than 70 feet square (around) which was covered in the form of a pyramid. Though the walls were only 3 estados (18 feet) in height, the roof was more than 12 feet." The Sondor-huasi is illustrated by Mr. Squier at p. 394. No attempt has been made to represent the terraces, the description and plans not being sufficiently full.

BARR FERREE.

A FEW BUILDINGS OF OLD BELGIUM.



CHURCH OF VOROSMET

UNDER the heading of Bruges, at the end of the hotel list stands a name, "Panier d'Or," which Baedeker marks "unpretending" but which I find I have underscored with the decided words of praise, "where Thackeray stayed." This quaint little inn, surmounted with its "golden baskets" on every gable, has stood in the market-place for over a hundred years and its visitor's book recalls such guests as Longfellow, Dickens, Thackeray, George Eliot and Jean Ingelow. Its floors are sanded, its rooms are small and low-studded with thick beams crossing every ceiling, and its halls are dark and irregular, but the air of delightful ease that prevades the whole, the relics of by-gone days in the shape of carved chests and old china, the exquisite clean linens, and above all, the good things to eat, must endear it to the remembrance of every student who is fortunate enough to overcome that same condemning word "unpretending," and make it his abiding-place while in Bruges.

From the windows of the "Panier d'Or" one looks across the market-place to the Halles, a large building erected in the thirteenth and fourteenth centuries from designs by Peter Dieriex. The building forms a rectangle 48 yards broad and 93 yards deep, one side of which was formerly used as a meat-market. The Belfry or Grande Tour which Longfellow made famous by his well-known poem, rises in the centre of the façade on the market-place, and attains a height of 350 feet. It is built in the fourteenth-century style, story above story, each with its corner turrets, and surmounted by an octagon containing the chimes, and from whose summit an extensive view is obtained.

The three other sides of the Place and the innumerable streets running from it, are filled with mediæval bits of domestic architecture, and along the sides of the canals, the towers and doorways form abundant fruit for pencil and brush.

In the small Place du Bourg are found the Hôtel de Ville, and Palais de Justice, buildings suffering from the raids of war and fire, which have been finely restored, and are beautiful specimens of fourteenth and sixteenth century Gothic. On all sides are found the relics of past grandeur. It is sad to think of the greatness of Bruges so utterly passed away; but if her population were more ambitious, if one-third of them were not actually paupers, as the statistics show, how quickly would vanish all that air of mediævalism, that feeling of hundreds of years ago. Fancy modern buildings supplanting all her quaint gabled treasures, the five noble gateways that surround her torn down to make way for so-called "improvements."

No! far better that Bruges should live in the past and preserve her charm for student and poet, than fill her streets with factories, and join in the race for wealth.

Passing through the gate S. Antoine, and out into the country, one finds a picturesque combination of landscape and peasant. On every side lie profitable farms, the red-roofed cottages nearly hidden by overhanging vines and fruit trees, and in the yellow fields men and women work together, and always shout back a cheery word to our greeting. Through the greenest of lanes we stroll along, the blue corn-flowers and scarlet poppies growing at our feet, till after half an hour we arrive at our destination, the farm of Koed-Kerken, "Cold Kitchen," which has fallen thus from its high estate of the Templars Abbey.

Under a battlemented gateway, surmounted by the arms of the Templars, we pass into the yard. Bits of the wall still stand, forming a back-ground for sheds and out-houses, the moat still surrounds the Abbey, though spanned only by a rustic bridge. The Abbey itself, a fine old bit of the eleventh century, stands on a knoll, its towers on one side sinking into the waters of the moat, which repeat their battlements and gables line for line. A huge round tower rises from

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the ground in front, whose warlike face is softened now by clinging roses and vines. Within, are high vaulted halls, the proverbially enormous fireplace at each end, with brick hood and narrow shelf, and the tall, narrow windows contrast oddly enough with the simple, home-like furnishings of the farmers. Winding stairs of carved wood lead to upper chambers in the tower, which are now dismantled and bare, and the rows of blue delft and shining copper pans are the only decoration where once armorial bearings and rare tapestries graced the walls.

The Hospital of S. John is an interesting bit of architecture. One enters its grim stone walls under a portcullis, but once within, small courts filled with flowers, cheerful corridors and sunny walls belie its outward appearance of coldness. The curious sculptures over the gate are of thirteenth-century origin, but the greatest treasure of which the hospital boasts is the rare collection of Memling's paintings, which one finds in the old chapter-house, a fit setting for their quaint style.

From the hospital one strolls on to the quiet Beguinage, a group of white-washed cottages surrounding a tiny chapel under great branching trees. But this extraordinary scheme of seclusion from the world may be studied with greater ease at Ghent. There the buildings form little towns by themselves, with streets and gates, and surrounded by walls and moats. These Sisterhoods have always been held in great reverence, and even in the most bitter ages of reform, when abbeys and convents suffered a common fate of suppression, the Beguinages were passed by untouched, and no doubt proved a welcome asylum to many a poor wanderer.

The first thing one does in Ghent is to go to the Cathedral and see the great altar piece of the Van Eycks, "The Adoration of the Lamb." This hangs in a side chapel, where one is carefully locked in, and a curtain drawn aside before its beauties are revealed. The poor unfortunates who have not paid their franc stand without, and try in vain to catch a glimpse through the railings. Fortunately, all the time one wishes to look at this stupendous painting, is granted, the old sacristan, with his heavy bunch of keys dropping from his fingers, dozing meanwhile in the corner. The Cathedral itself is uninteresting, except for its interior decoration, among which are the names and armorial bearing of the Knights of the Golden Fleece. A curious pulpit of marble and wood stands in the nave.

From a corner in the Rue de la Croix one may count five beautiful towers in view at once, S. Bavon, the Belfry, S. Nicholas, S. Michael, and the Hôtel de Ville, and back of the Hôtel de Ville, about the Marché du Vendrédi are old relics by the dozen. Quaint, high-gabled houses, stone bridges, the Cloth Hall erected in 1325, and the famous Oudeburg, a massive castle-like gateway which is all that remains of a great palace that was built on this site in 868.

There are many treasures in Ghent that the casual visitor misses, and in the pathetic words of a blear-eyed guide who volunteered his companionship during our stay, "they go away and say, there is absolutely nothing in our beautiful Ghent."

The mediæval bits of architecture are not so easy to find as at Bruges, but are wonderfully satisfactory, for these rich old burghers have always built well and lastingly, and much wealth of carving and detail can be found if quietly searched. Then too, there is the fine ruin of S. Bavon's Abbey, near the abattoirs, across the canal. It is an easy walk if one knows the way, and within its quiet walls, one can make many a sketch of arch and tower. The cloisters and a low round tower adjoining are still in good condition and in the dining-hall are windows, traceries and a few stone graves. The chapel is nearly demolished, and the garden is full of broken bits of carving, tombs and pillars and one or two capitals in pure, early-Gothic style.

One of my pleasantest anticipations in planning a visit to Antwerp was the thought of seeing that historical monument of printing, the Plantin-Moretus Musée. Christopher Plantin, the head of the family set up his shop on this site in 1555, and from that date until 1875 the business of printing was carried on by this family, in the same workrooms and offices. It has since been purchased by the government and is now an interesting relic, preserving the character of a patrician dwelling and business house of olden days.

The building surrounds an oblong court, on two sides of which are the dwelling apartments and on the other two the offices. An aged grape-vine wreathes the windows on one side, and under an open arcade at one end stands an antique pump and a carved spiral staircase. The offices and salesrooms open to the street from this end and one can imagine the dignified and quiet transactions that went on in these rooms.

The work-rooms are still filled with all the implements for a vast business. Numerous printing machines, with forms of type all ready, as if business was to be renewed on the following day; proof-rooms, with the old tables covered with sheets, desks open, ink-horns and quill pens about, quaint pigeon-hole cupboards stuffed with old manuscript, and in every room the diamond-paned windows looking out into the sunny court. The family were so conservative in their art, that they even had a foundry for casting their own type in one of the upper chambers of the building.

All that wealth and taste could devise, that was also consistent with hereditary dignity, was lavished on the dwelling apartments of this excellent family. On the lower floor are several rooms panelled in oak and hung with tapestry or Spanish leather, the beams and the ceiling being carved and bearing the motto of the house "*Labore et Constantia.*" Huge oak fireplaces occupy the ends, and the windows are shuttered with oak and rare wrought-iron. Many portraits hang on the walls, painted by the best of Flemish artists, friends of the Plantins, and bits of carved furniture, chests, chairs and tables stand in every room. In long glass cases are exhibited specimens of work from the earliest days of the house, and old testaments yellow with age, and letters and prints. Up the wide and low stairs we find the chambers, each filled with rare tapestry and furniture, the delight of the Flemish housewife's heart. And one great angle of this floor is occupied with the library, one of extraordinary size and opened now to students, by permit from the city authorities. All is dignified, quaint and home-like, and a charming picture of the life of olden days.

The ancient prison of the Steen is also full of interest. At present the wretched hand of restoration has fallen upon it, but there is still enough of the old to show what a grand old pile it must have been. Situated on the quay that borders the Schelde, and at one end of that popular promenade for which Antwerp is famous, its position is prominent, and so long as it remains, it will be a picturesque object. Formerly the Steen formed a part of the Castle of Antwerp and was the scene of many bloodly conflicts, and afterwards as the seat of the Spanish Inquisition it witnessed scenes no less horrible: at present in its character of a Museum of Antiquities it still preserves an awful grimness, from its stone walls, narrow windows and fierce catalogue of arms.

One enters through a grandly carved archway, into a small paved court, which is filled with broken bits of stone carving, pillars and cannon-balls. Through the heavy oaken door are numberless rooms dimly lighted with narrow windows set in thick stone walls where one finds historical relics of all kinds and ages, celebrated swords, bonnets and gew-gaws, and up the narrow, foot-worn stairs, in rooms where many a noble soul chafed and pined, are collections of furniture, some old effigies from the days of those famed processions, and a case or two of Roman remains.

But the crowning point is reached when with a "*Prenezgarde, Monsieur!*" the concierge gives one a lighted candle and points to the way down stairs. Stumbling and feeling our way from step to step, we descend as it seems, into the bowels of the earth. A chill strikes through one, from the dampness and the horrible recollections that come surging to the mind. These are the *oubliettes*, into which it one entered, the door closed forever; the world outside must forget the unfortunate to whom death came as a welcome guest.

In one of the lower prisons a ray of light penetrated, but most of them were totally dark, and about ten feet square. Water dripped and oozed from every crack. The doors were triple barred and locked, and in one cell we saw a thick post with chains and anklets attached. All was horrible enough, and we understood that the worst cells were not visible to the public, being literally under the surface of the river.

The student should walk from the Steen up the steep Rue de Steen that leads to the Grande Place. On every side are the relics of old Antwerp, the city as she was in the days of her glory. The curious Halle aux Poissons is in a side street, its red and white stripes and stepped gable making a noticeable landmark, and in the Grande Place itself are dozens of those tall stiff buildings called the Guild Houses, which formerly represented so much power and wealth.

These three old towns of Bruges, Ghent and Antwerp have many churches that are beautiful and fine, but to me the municipal buildings and domestic architecture are of deeper interest, and their history is one relating to their great struggle, first for wealth and then for independence, a struggle which will always identify the people of the low countries.

M. R. B.

THE COST OF ANCIENT STATUES. — The famous Colossus of Rhodes was made of bronze and was seventy cubits (or about one hundred and five feet) in height, was twelve years in making, and is said to have cost only 300 talents, or about £75,000, if we reckon the Attic talent, or £102,000 if we reckon the other talent, and probably the latter talent is to be reckoned in this case. At all events the so-called Colossus of the Sun, in the Capitol, which was a bronze figure of Apollo, only thirty cubits — or forty-five feet English — high, brought by Marcus Lucullus from Appollonia, in Pontus, cost five hundred talents, which, if reckoned even as Attic talents, would be over £125,000, and it would hardly be probable that the Colossus of Rhodes, which was twice its height, could have been executed for so much less. But this is a trifle compared to the price paid for a colossal statue of Mercury, made for the city of Averni, in Gaul, by Zenodorus. On this work he was engaged for ten years, and the cost of it was £335,000. What the gold and ivory Athena of Phidias in the Parthenon, or his Zeus at Olympia cost is not stated by any ancient author. The gold employed on the movable drapery alone of the Athena was over forty talents in weight of unalloyed gold, according to Thucydides, whose exactness in such matters is above suspicion. This would be equivalent to some £116,000 in coin, while a single lock on the head of the Zeus at Olympia weighed six minæ, or about the value of nearly £5,000. For the famous statue of Diadumenos, which was a bronze figure of life size, representing a youth tying a fillet round his head, Polycleitus received 100 talents, or about £25,000. — *Blackwood's Magazine.*

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ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

THE NEW SORBONNE, PARIS, FRANCE: THE VESTIBULE D'HONNEUR. M. H. P. NENOT, ARCHITECT.

[Gelatine Print issued only with the International and Imperial Editions.]

THE FACADE OF THE NEW SORBONNE ON THE RUE DES ECOLES.

THE GRAND HALL OF THE NEW SORBONNE.

FOR description see article elsewhere in this issue. A heliotype of M. Puvis de Chavannes's painting in this hall was published in our issue for March 22d last, and a print of the tomb of Cardinal Richelieu in the *American Architect* of June 23, 1888.

BUILDING FOR EBEN D. JORDAN, ESQ., KINGSTON, BEDFORD AND COLUMBIA STS., BOSTON, MASS. MESSRS. WINSLOW & WETHERELL, ARCHITECTS, BOSTON, MASS.

HOUSE OF A. T. HUNNEWELL, ESQ., ON POWDERHORN HILL, CHELSEA, MASS. MESSRS. RODMAN & NORRIS, ARCHITECTS, BOSTON, MASS.

THE PENNSYLVANIA WORKING-HOME FOR BLIND MEN, LANCASTER AVE. AND 36TH ST., PHILADELPHIA, PA. MR. JOHN ORD, ARCHITECT, PHILADELPHIA, PA.

THIS building is now in process of construction at a contract price of $33,148, which includes granite base and red stretcher-brick superstructure, plank floors and roofs — the latter covered with tin — and copper bay-windows. The stairway, which is entirely fireproof, is outside the building altogether, giving more room and greater safety.

[**Additional Illustrations in the International Edition**]

DINING-ROOM IN THE HOUSE OF WILLIAM H. NICHOLS, ESQ., BROOKLYN, N. Y. MESSRS. ROMEYN & STEVER, ARCHITECTS, NEW YORK, N. Y.

[Copper-plate Etching.]

RENAISSANCE WINDOW IN THE CHATEAU DE PAU, FRANCE.

[Copper-plate Etching.]

THIS window deserves the attention of architects on account of the skilful disposition of the mullion and the casing, as well as the scientific arrangement of the profile and ornamentation.

HOUSE IN MAYENCE, GERMANY. HERR VAN HOVEN, ARCHITECT.

[Gelatine Print.]

THE NEW CITY-HALL, VIENNA, AUSTRIA. PROFESSOR BARON SCHMIDT, ARCHITECT.

[Gelatine Print.]

MARBLE HALL AND STAIRCASE IN NO. 6 CARLTON HOUSE TERRACE, LONDON, ENG. MESSRS. ERNEST GEORGE & PETO, ARCHITECTS, LONDON, ENG.

THE POLES, HERTFORDSHIRE, ENGLAND. MESSRS. ERNEST GEORGE & PETO, ARCHITECTS, LONDON, ENG.

THE HALL, SHIPLAKE COURT, ENG. MESSRS. ERNEST GEORGE & PETO, ARCHITECTS, LONDON, ENG.

HOUSE WITH STUDIO, NEAR GUILDFORD, ENG. MESSRS. ERNEST GEORGE & PETO, ARCHITECTS, LONDON, ENG.

PREMISES ON SOUTH AUDLEY ST., LONDON, ENG. MESSRS. ERNEST GEORGE & PETO, ARCHITECTS, LONDON, ENG.

THE late arrival of a steamer prevents us from printing with the illustrations of Messrs. Ernest George & Peto's work the text pertaining thereto. It will be given in next week's issue.

WE find that the "House in Kolowrat Ring, Vienna," published in last week's number, should be credited to Herr Schlaf, instead of Herren Fellner & Helmer.

BOOKS AND PAPERS

PARIS[1] is certainly the most intellectual city in the world. No doubt there are plenty of illiterate persons there, but the great majority of the people show an interest in what is worth being interested in, and a desire to extend their stock of information, which is not to be found, or, at least, is not publicly manifested, in any other great city that we know of. We remember, some years ago, meeting a procession of book-peddlers on the Rue de Rivoli. The familiar cry of "*Vient de paraître!*" arrested our attention, and we stopped to see what the work might be which a Parisian crowd was expected to absorb as if it were buying newspapers. It turned out to be a Volapük grammar; and, while we could not help being amused at the idea of selling books of this description out of baskets, as if they were peanuts, we wondered, at the same time, how many weeks, or months, the venders of such literature would have to canvass Broadway before their stock grew perceptibly lighter. But where there is one person in a New York crowd who would seize such an opportunity to improve his mind, there are ten in Paris, and a well-written book of useful information is sure of a market there. Hence it is that books containing such information, concisely, simply and attractively presented, are very common in France, and nearly every important occurrence is followed by the appearance of an admirable little work, serving not merely as a souvenir, but containing a mass of interesting statistics, usually explained by many illustrations, which serves to fix in the minds of those familiar with the subject the things most important to be remembered, as well as to convey to others an adequate idea of the affair. Of this sort is the little book before us, which gives a lively picture of the great Exposition of 1889, made solid, so to speak, by multitudes of statistics in regard to matters of engineering, finance and so on, which are sure to prove useful for reference, and illustrated with innumerable plans, wood-cuts, photographic process-plates, and diagrams. A short historical retrospect of the great international exhibitions begins the book; then the various departments are taken up in order, and the best and most useful new knowledge which each department had to offer is very cleverly presented. As an example, we may particularly mention the chapter describing the Forestry Pavilion and its contents. After some pretty process-plates showing the construction of the pavilion itself comes a series of plates, showing more or less magnified sections of various sorts of timber, first in health, and afterwards as affected by diseases and by insects. The peculiar appearance of wood affected by both dry and wet rot is beautifully shown, as is also a peculiar yellow rot of oak; and a separate section represents the appearance of oak, still sound, but penetrated by the white threads of the dry-rot mycelium, so vividly that no one could fail to recognize the disease from it. The effect of the gnawing of worms is also shown, both in the timber and on the living tree; and the most dangerous parasites are represented. Still more interesting than this, however, from a scientific point-of-view, is a series of beautiful photographic plates which follows, showing the processes of "reboisement," or reclaiming and replanting forest lands. It is well-known that the French Government has made great efforts within the past twenty years, not only to check the violence of the torrents which in spring, when the snow melts, rush down the mountain sides and devastate the fields below, but, by the same means, to cover the bare, rocky slopes with valuable timber. The attempt has been completely successful. Many villages, once desolated by annual floods, which swept all vegetation away, leaving the rocks parched and bare, are now clothed with young forests, which the stream, restrained in spring by the soft, spongy soil, as well as by the shading of the snow-covered ground, serves to nourish rather than destroy, while the inhabitants, lately reduced to poverty by the violence of Nature's operations, now find themselves, through the application of scientific care, provided with constant occupation in the new forests, and with a prospect of an assured living, if not of prosperity, before them. The means by which all this is accomplished are beautifully shown in the plates. In general, the course of the mountain torrent at the bottom of the valley in which it is proposed to operate is interrupted by a series of "barrages," of stone and other materials. Walls of rock are built in favorable places on the slopes, and earth filled-in behind them, in which the young trees are planted. These little terraces check the water which would otherwise run down the slope to increase the torrent below, and, as the trees grow on them, a foothold is afforded for catching new soil, which may be washed down toward them, and extending the growth, which, once established, increases in every direction; and, in a few years, with a little judicious care, the rocks begin to be hidden by the luxuriant growth of the young trees, while the stream in the valley from an occasional torrent, violent enough to be dangerous for a few days in the year, and nearly dry the rest of the time, is reduced to a pretty brook, which runs all the year round, but never rises to a dangerous height. A pair of views of the same valley, one taken in 1877, at the commencement of the work, and the other ten years later,

[1] "*L'Exposition Universelle*," par Henri de Parville, précedée d'une Lettre-Préface par A. Alphand, Directeur-Général des Travaux de l'Exposition, 710 pages, 700 illustrations. Price, bound in cloth, $2.00; in paper, $1.50. For sale by J. Rothschild, publisher, 13 Rue des Saints-Pères, Paris, and by all American booksellers.

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showing the bare mountain-side clothed with vegetation, shows most instructively the process and its effects.

We might go on for an indefinite time, calling attention to interesting points in the book, but it is only fair to let every one look for himself for what he likes best, and there are few who will not find something that they like.

Those of our readers who have not yet procured a copy of the admirably illustrated catalogue of the Boston Architectural Club Exhibition will be glad to learn that copies may still be had at the club-rooms. The price is 25 cents each, or they will be sent, postpaid, for 35 cents each.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

BOOKS ON THEATRE CONSTRUCTION.

Louisville, Ky., May 24, 1890.

To the Editors of the American Architect:—

Dear Sirs, — Your correspondent, Mr. Herbert P. Kelley of Philadelphia, who, in the *American Architect* of the 3d inst., asks for some work upon theatre planning and construction, will possibly find some information in a book recently published under the rather ponderous title: "*Scene der Alten und Buehne der Neuzeit: Ein Beitrag zur Lœsung der Volkstheater-Frage, zugleich ein Versuch zur Raumgestaltung grosser Zuschauerraeume; aus den bisher ueblichen Theater formen entwickelt von A. Sturmhœfel,*" *Stadtbaurath A. D.* Berlin, 1889. Verlag von Ernst & Korn.

Yours truly, Leo. Miller.

SUGGESTIONS FOR IMPROVING BUILDING METHODS.

Boston, Mass., May 24, 1890.

To the Editors of the American Architect:—

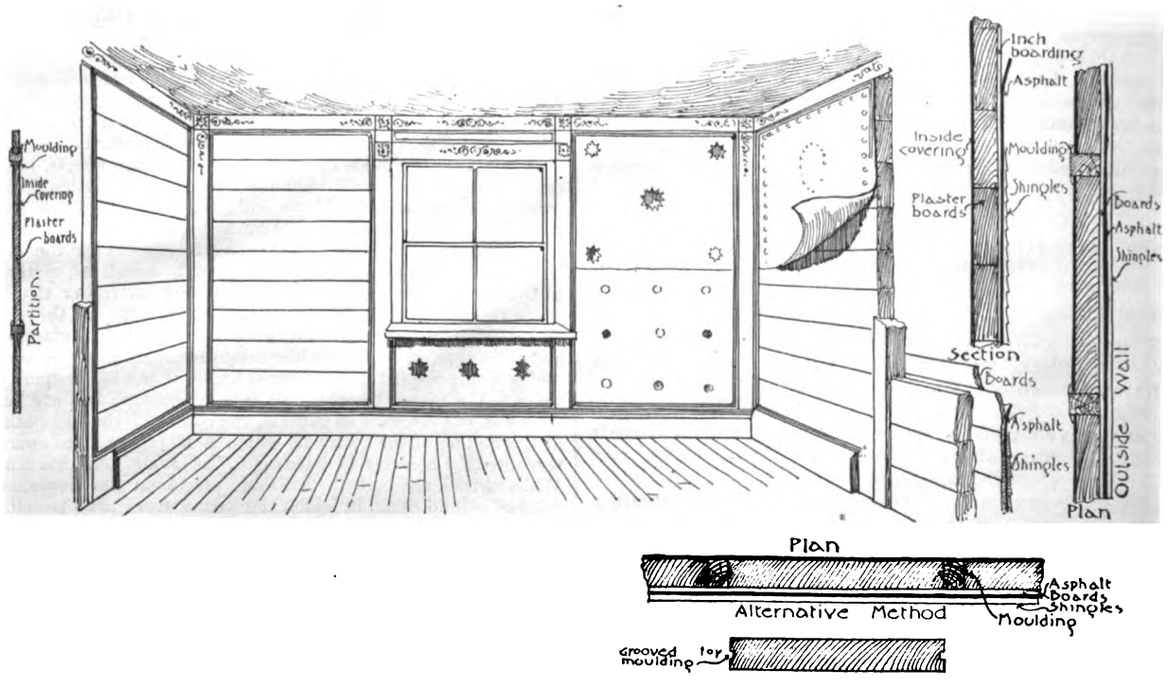
Dear Sirs, — It is pleasant to note the gradual change from the "crazy roof" on dwelling-houses once described by me in your columns, to the hipped roof of the old colonial style; a true *renaissance* in the construction of country-houses. There is one obnoxious feature, however, in the construction of flat-roofed city buildings, both warehouses and dwelling-houses, which vexes the mind of one who cannot directly improve the methods of combustible architecture. When I pass by expensive warehouses and blocks of dwelling-houses which are being constructed with a flat roof made of thin boards, from which plastering is to be suspended perhaps two feet below the under side of the roof, I can only wonder at such examples of what can only be called foolishness or ignorance. Doubtless the intention is to interpose an air-space; thereby to prevent the passage of heat and cold through the roof. The effect is to make an oven in the roof, and also to make a most dangerous hollow space into which fire may penetrate, to the destruction of the building and to the danger of the firemen who may venture upon the roof in trying to extinguish a fire. A properly constructed plank roof costs no more, is a much more effectual safeguard against heat and cold, and is in every way safer, stronger and better.

But the object of this communication is to call the attention of architects to a new substance in which the writer has no interest, and which may not find any great use in mill practice. I refer to the "plaster board," so-called, which is being introduced by the American Plaster Board Company, 50 New and 52 Broad Streets, New York. I do not give this notice for the purpose of advertising the Company, but I think it may be a favor to architects to have their attention called to this material. It is as yet little known. This plaster board is made one inch or two inches in thickness, of a mixture of plaster-of-Paris and hair, bonded together with the reeds commonly called "cat-o-nine-tails." It can be made in given lengths and widths. It is likely to be impervious to heat and cold. It may probably serve as a deafener when fastened to the under side of a plank and timber floor between the timbers. It is a good retardent of fire. It may be nailed up either with asphalt-covered nails or tinned nails manufactured for the purpose by Dunbar, Hobart & Company, of South Abington; or these boards may be cut in given lengths and held up at the ends by mouldings.

It would seem as if there might be a wide field for the use of this material, not only in the construction of ceilings and roofs, but in place of other material in outer walls of wooden houses and in partitions. The material can be placed between timbers or partition studs, then finished off in a day with a skim coat, so that not exceeding a day will be required for the building to become dry; or it may be made use of as a substantial part of the construction in the manner indicated by the enclosed diagram, which was made for me at my suggestion by one of our young men, Mr. Perry, which you are at liberty to copy if you desire to do so.

I would suggest that the floors and other wooden material for small houses of two-stories with flat roofs, might be cut to order in a manner corresponding to the enclosed sketch; be erected and finished within a very few days, without any delay for the drying or plastering. A family could then move into the house even before the outer coating of shingles or clapboards had been put on. I venture to suggest that brick chimneys would also become superfluous if a double earthen pipe with the interspace filled with plaster-of-Paris should be so placed as to be free from the danger of being broken by any settlement or twist of the timbers of the house. These are suggestions merely which I hope some competent architect may work out.

In fact, there is no difficulty in theory in planning an eight or ten room house, two-stories high, of which all the material may be cut



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to measure at the saw-mill and at the plaster-board mill, to be covered by a flat roof protected on the outside with cotton duck properly prepared and laid over the roof as cotton duck is laid over the deck of a vessel. If the materials were properly and promptly assembled, such a house could be ready for occupancy in two or three weeks after the work had been started; the flat roof properly railed in might serve as an excellent play-ground for children in winter, or for an excellent out-door resort at the sea-side in summer. In point of fact, such a house would be warmer in winter, cooler in summer, more durable and more suitable for simple household purposes than the common "æsthetic" shams made up of thin boards, lath and plaster, and fret-sawed mouldings.

Very truly yours, EDWARD ATKINSON.

[WE do not like to throw cold water on any suggestions for improving building methods, and least of all on such excellent ones as we get from this source, but the fact that architects are often accused of being indifferent to such matters makes it proper to mention that the problem of filling-in four-inch studding with plaster boards one or two inches thick does not seem to us to be very successfully solved in the sketch; while, even if it were, there are much cheaper and better materials for the same purpose, which are extensively used by architects. The best way of using plaster board that we know of is to nail it up for ceilings, which is often done, both with the material mentioned, and with similar combinations of plaster and fibre, which have been made and sold, and specified by architects, for fifteen or twenty years, at least. As to the plank roof for "expensive warehouses" and city dwellings, we must, as before, mildly object to such expressions as "foolishness or ignorance," as applied to the architects who design such buildings with flat ceilings, furred down from the roofing proper. There is not one of these architects who does not know perfectly well that plank is much more fire-resisting than boarding, and that air-spaces under the roofing harbor fire; but they have their clients — not the insurance companies — to please, and most of the former prefer both the level ceiling, furred down from the roof, which must slope, to throw water off, and the air-space, and will not sacrifice either, or go to the extra expense of plank roofing, for the sake of protecting themselves against a risk which the underwriters assume for them. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

THE BURIED TREASURES OF STAMBOUL. — There is no exaggeration in saying that Stamboul, the antique portion of Constantinople, rests upon a stratum of vaults, passages, chambers and halls of unknown date and purpose, many of them superbly ornamented and all superbly built. Now and again they come into view by subsidences of the earth, and some are always accessible. The quarter named Fazli Pasha stands upon a labyrinth. When it was swept away by fire, in 1877 — if we remember the date correctly, says the *St. James Budget* — the ground opened in many spots, and some English residents of Pera made several explorations. Astounding was their report. The hill upon which stands the tomb of Fuad Pasha is pierced in all directions like an ant heap, as they said, by vaults of fine masonry, leading no man knows whither. The same mysterious structures have been found in other parts when occasion served, especially in the neighborhood of the Seraskierat, or war office. Here, indeed, they are magnificent beyond belief; the passages and chambers so lofty that they were adorned with pillars of the Corinthian style at intervals. Very many capitals of these, dug up when the foundation of the new building was laid, strewed the upper earth not long ago. But we would speak of marvels which the visitor can see — or could a few years back. The grandest of all is closed now. This is Yere-Batan Serai, the "Underground Palace," which stands so far above the rest that we may concentrate attention on it. When scoffers like Juvenal discredited the stories of Hellenic wealth and power in bygone days, Plutarch bade them look upon the Parthenon. So the dullest philistine of modern times must see that legend does not exaggerate the magnificence of old Byzantium when he visits this astounding edifice. It lies behind the water-tower of Santa Sophia; and we used to gain admittance readily enough through a hole in the court-yard of a private house near by. Descending a few yards one reached a narrow, shining platform of granite, which doubtless encircled the whole area. In the underground palace is a cistern — nothing more luxurious than that; but such a cistern as we of the nineteenth century could picture only in dreams. A few steps below lies the water, shining black as ink under the candle rays. One huge pillar opposite is illumined at its base, and rises darkening upwards to the roof, where its fine Corinthian capital is faintly outlined; another on each hand and in front shines less clearly, and another beyond; then darkness closes in. How far the long array stretches right and left and forward no one knew with certainty, and an imaginative person would not be anxious to measure, being content to behold a scene without parallel on earth. For the vault is not quite black. Here and there the roof has given way in cracks, and pencils of daylight shimmer through, brightening a capital in the distance, gleaming on the water, reflected up and around the spectral columns. As far as eye can see, water stretches and pillars rise. We have heard it said that they number 336, disposed in 16 rows lengthwise, and 28 rows in breadth; but who counted or measured them is not recorded. The guide, a servant of the Turkish householder through whose court-yard we passed, had legends enough. He told with circumstantial detail how, in his predecessor's time, a "Chelebi," a Christian visitor of distinction, brought a boat down, launched it, and rowed out — never to return. Another, in his own day, made a like attempt, but he fixed a cord to the platform on starting. After rowing for an hour he found no wall to the cistern. Perhaps the mystery is solved now — the more pity if it be! To measure Fairyland and draw up a statistical report of its wonders is a sorry service to mankind. It should be added that the modern entrance was simply a fissure in the wall. Doubtless there is a portal somewhere corresponding with the fine sculpture of the columns. Yere-Batan Serai is attributed to Constantine the Great — on no particular authority, we believe. Another great series of vaults accredited to him underlies the western end of the Hippodrome. Access has been closed for a good many years. Those who have seen it declare that this also was a cistern, but from the position one might almost suspect that it was connected with scenic displays. The Bin Bir Direk, "thousand and one columns," is supposed to have been built by Philoxenus, a great man of Constantine's day. Being dry now and partly unroofed, it is inhabited by silk weavers. The columns of marble, partly buried in rubbish, number 225, to be accurate — loftier than those of the palace. Dry also is the cistern attributed to Theodosius; but its Corinthian pillars are even finer than elsewhere. So is that of Arcadius, said to be the handsomest of all as a work of art; but it lies near the Mosque of Selim, somewhat out of the way of travellers. Close by the Mosque of Emir Ahker lies a graceful cistern, with 24 columns richly sculptured, a stable for cows and horses. Beside these, we have in Stamboul a number of open reservoirs, mostly used at present as market-gardens. The largest of these is the Tchukonr Bostan, "the sunk garden," 200 yards square, beyond the cistern of Arcadius; another of the same name by the Adrianople gate.

THE GHETTO AT FLORENCE — But as I have said, go ahead, hand-in-hand with stagnation, is the order of the day in Italy. Even artistic Florence has awakened to the necessity of coming up with the times, and is adorning herself with tramways after the fashion of modern towns. Already the beautiful Viale dei Colli and the grand old Poggio Imperiale have been broken up and torn to pieces, and the hissing, spitting machines, and the patient, long-faced Hungarian horses drag ugly cars up hill and down with an accompaniment of shrieks and whistles, smoke and steam, very annoying to dwellers in the immediate vicinity. The Ghetto, hateful record of the cruel, persecuting past, is fast melting away, the sun shines where formerly stood dark, narrow streets, where bands of masonry from house to house arched overhead and barred the sight of the sky. Hotbeds of fever, nurseries of cholera, dens of crime they were, those wicked, filthy old streets over whose disappearance Ouida has poured forth quires of eloquent lament in the London *Times*. It is true they were picturesque, but does that compensate for keeping haunts of vice and disease in our midst. No doubt the dwellers in these holes scolded and growled because they were moved away from their haunts and from their customers, but despite their picturesqueness and their historical interest, it is better, far better that they should go. Florence is off the line of military strategy, and besides people do not batter towns to pieces in these days. So the inhabitants have to take them to pieces themselves, when they get too old. After all, towns are made to live in, as well as to look at and to sketch. Meantime dozens of sketchers have been busy in the Centro since it was condemned, preserving to posterity all that deserves to be perserved, and on paper and canvas these fever haunts can do us no harm. The nonsense that has been talked and written in American and English circles on this theme passes belief. It is a popular idea among tourists that Italians are not fit to be entrusted with the charge of their own antiquities, that an international committee should exist to preserve them. The truth is far different. Italians guard jealously all that is worth guarding, but they do not wish to be a mere nation of museum custodians, they also wish to go on with their age, to make their cities salubrious as well as beautiful, livable as well as picturesque. And ought Americans and English, the first people to worship comfort and health, to say that they are wrong? No doubt improvement entails some losses, the removal of some familiar landmarks. Thus among other episodes of the demolition of the Ghetto and Old Market, so-called already in the eleventh century, think then how ancient its tenements must be, was the solemn removal of Giovanni da Bologna's quaint charming figure of the devil, familiar to all Florentine visitors, which hung low outside the corner of the house, marking the site of a pulpit from which S. Pietro Martire exorcised the evil one. The little fellow has been copied again and again in wood, bronze, terra-cotta, plaster, even gold and silver, but he can never look so well anywhere as he did in his old corner, clinging on to the tumble-down house of the Vecchi family, who existed already in the days of Dante, and are commemorated by him for their simple habits. The funny little imp was removed from his traditional site in the presence of the syndic of Florence, and of a deputation from the municipality and the council of fine arts. He is for the present to remain in that storehouse of Florentine art, the Bargello. It is worth mentioning, perhaps, that all outdoor decorations in Italy in the shape of frescos, statues, etc., are considered the property of the municipality of the town or village. This is done in order to preserve them to the nation and to prevent their being sold or removed without the consent of the authorities. Of course, however, the municipality cannot remove them or dispose of them against the will of the owners of the houses which they decorate. Besides the devil, there was a most beautiful Luca della Robbia in the market, which was removed, or, at all events, consigned for removal at the same time, also to be placed in the National museum. This Luca has been boarded over for a long time, so it is not lost, but rather recovered, to the outside world. — *Helen Zimmern, in N. Y. Commercial Advertiser.*

ITALIAN ARCHITECTURAL DRAWINGS IN WINDSOR CASTLE. — Among the objects of which we have copious detail drawings are those of the completion of St. Peter's and building the sacristy; the alterations of the basilican churches of the Lateran, St. Sebastian, and St. Maria in Trastevere, which were required by a change of ceremonies at the period of the papal benedictions of the Pope; a great number of new churches, among which San Ignazio, Spirito Santo, San Pietro in Montorio, works connected with Santa Maria dei Angeli and many others; among the villas are the Giulia, Medici, Albani, Riarii, Madama, Pamfili, and the banqueting-house of Cardinal Farnese; among the public buildings, the Curia Nuova, the Propaganda, and many of the buildings on the Quirinal; of the theatres, Alibert, Tordenone, that at Parma so well-known: the noble flight of stairs or salità of the Trinita ai Monti, and the fine façade of the fountain of Trevi. Among the

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objects of antiquity are drawings of the columbaria about Rome, and of all the temples and basilicas in the state they were in at the time. Valuable as those are which represent objects still in existence, there are many which have a twofold value to the Roman antiquary, because they have since wholly or in part disappeared. Among them are the Temple of Minerva Medici, that in the Forum of Nerva, the Settizonium of Septimius Severus, the villas of Hadrian and of Pliny, and a great number of relics formerly in the Appian Way. There are also rich treasures in beautiful copies of friezes, arabesques, stuccos, and mosaics, taken from the remains of antiquity, many of which have faded since exposed to the light, and some, perhaps, have perished. But the architects have not confined themselves simply to building operations; they have condescended to design the minute adjuncts to decorations required. We find among those volumes drawings for altars, tents, tombs, funeral decorations, chimneypieces, fountains, and even lamps and thuribles. Nor have they been content with the artistic portion of their profession; we find among those volumes evidences of high scientific knowledge; we have drawings of harbors, with the method of repairing breaches of the sea and constructing breakwaters — on a less scale, it is true, but as ably planned as that at Plymouth, and a more wonderful work, if we consider they could not compel the services of that gigantic helot, steam, in those days. There are also designs for prisons and houses of correction, quite on the principle of our system of inspection, plans for complete drainage of towns, and a number of others, which show that architecture and engineering were at that time synonymous arts. Not only so, but military engineering exhibits itself largely in these volumes. There are plans of the sieges of Tortosa, Monferrat, Fuentes, Antibes; a number of military plans for various parts of the country; projects for fortifying the city of Lucca, which were carried out and now exist; curious designs for towers of defence, mounting one large gun, like our Martello towers; designs for large granaries; powder manufactories, with drawings of the machinery; designs for drawbridges: in short, specimens of almost all the useful and ornamental arts of the day may be found in those volumes. The names attached to the drawings, which in most cases, and perhaps in all, are autographs, are indeed deserving of deep respect, second only to those of the great men of the age which immediately preceded them, as De Vinci, Raphael and Michel Angelo. We find the names or marks of Giulio Romano, Domenichino, Bramante, San Gallo, Pirro Ligorio, Bartoli, Borromini, Oddi, the Fontanas, etc. And one precious volume is filled with original sketches chiefly from Venice, by the famous Canaletti. — *The Architect.*

Comforts of Moorish Architecture. — A few dainty balconies, flung like a drift of spume against these walls of white, are seen. The decoration of these is light and graceful, and one can readily trace the origin of the suggestive and enchanting Spanish and Italian balcony. But they were never for anything but ornament. No woman's form ever added complete grace to their beauty. But these balconies are rare. No windows are chosen for ornamentation. They are invariably high, little, barred, prison-like. All other architectural beauty is found in carved doorways, among which are many magnificent specimens; in bases and capitals of spiral stone pillars supporting arches vaulting the streets, over which superstructures often shut out the sky, and are in the pure Arab style of 1,000 years ago; about the façades and fonts of numberless fountains set in cool alcoves, projecting unexpectedly from blank walls, or built upright from the centre of tiny squares, the only places in all this old quarter where sunlight ever reaches the earth; and behind the massive walls, in interiors, whose structural grace and exquisite ornamentation are an endless feast of artistic delight. Again, one finds in these interiors the origin of that loveliest of all inner forms of household architecture, the Spanish patio, or court, which American people of wealth might so happily copy, at least with the modification of glass coverings; thus preserving all the enchanting features of wide, lofty, lightful open spaces; the desirable opportunity for promenades, fêtes and festivities within court and galleries: and, above all, perfect ventilation and facility for the noblest and most classic use of pillars, arches, balustrades, draperies, chandeliers or candelabra and songful fountains, possible for the beautifying of the home. And I believe there is yet to come to the common, and artistic sense of American home-builders a form of palatial, and yet delightfully comfortable, habitation exceeding in beauty and availability any yet adopted style. This will comprise a reasonably modified Elizabethan castle, or manse-house, exterior; the Moresque Spanish interior, with free use of gallery supporting column, and arch with domed central roof; and that sweetest of all provision for comfort and home-blessedness, the most liberal possible use of the ample, glorious fireplaces of England old and new. — *Correspondence of Commercial Advertiser.*

A Notable Greek Vase. — The British museum has acquired a Greek vase, long reckoned among the art treasures of Castle Howard. Though belonging to the decadence of Greek vase painting, it is interesting because of the subject, which presents one of the Greek legends in a light till now unknown in the Greek literature which we possess. It is the story of Alcmena. Her husband, Amphitryon, has returned from the wars, and is filled with indignation at her conduct during his absence. She has fled to an altar for protection, where we see her on the vase. Meantime Amphitryon and Antenor have piled up in front of the altar a pyre of wood and are proceeding to light it. Alcmena raises her hands to the heavens and implores Zeus to help her. In the upper part of the vase appears Zeus, partially visible; he first hurls his thunderbolts at Amphitryon and Antenor, and next sends a tempest of rain to put out the fire. The rain is indicated directly by a great rainbow enclosing a space thickly dotted with drops of rain, and indirectly by two Hyades above the rainbow, who pour down water from vases. Beside one of the Hyades is a figure of "Morning." The names of the various persons, except the Hyades, are inscribed on the vase, so that there is no doubt of the meaning. The vase belongs to a time when it was not uncommon for vase painters to take their subjects from the dramas of Euripides, and it is thought that the source of this design had been a lost drama of his, entitled "Alcmena," several fragments of which have been handed down by grammarians. In Plautus a storm is called an "Alcmena of Euripides." A similar scene was enacted in the case of Crœsus when Cyrus, having taken him a prisonor, set him on a pyre to be burnt alive. Crœsus appealed to Apollo, to whose temples he had made so many valuable presents, and Apollo responded by a violent shower of rain, which had the effect of releasing Crœsus. That scene also occurs on a vase. The work in the museum is unique as comprising a representation of rain. Most curiously, the garments of the Hyades, which are distinctly crimson, are spotted in white lines of dots, which, beyond a doubt, indicated drops of rain. The rainbow is banded in different colors. — *Commercial Advertiser.*

The Scarcity of Bridge Timber. — It's rather queer — the fact that the Boston & Maine had to suspend operations on its Kittery-Portsmouth bridge for a whole season because the company could not find suitable timber for its completion. The depletion of our forest treasures is no myth. — *Lewiston (Me.) Journal.*

TRADE SURVEYS

The contractors and builders in several large cities have of late been gathering fresh courage in their contest with the striking carpenters; it is apparent that in some localities the employers will be able to hold their own, and the carpenters will have to yield. At several points strikes have occurred among other branches of the building trades, notably among the stonemasons of Pittsburgh, the bricklayers of Chicago and one or two farther Western cities, the roofers in Brooklyn and elsewhere, and the plasterers in several other cities. There is a feeling of restlessness among the workmen in the building trades generally, but it has been checked to a great extent by the determined stand which the employers have taken; had they generally given in, on May 1, it is safe to assert that ere this a more or less general strike would have taken place. As it is, the strike is being narrowed down and comparatively few workmen are now out. Statements made by leading builders and contractors indicate that future demands upon the part of the workmen will be resisted with great determination. The workmen are conservative, but it is probable that they would be rash if an opportunity for a successful strike seemed to present itself. They have been disappointed at the result of the strike of May 1. Notwithstanding the successes heretofore referred to, so far as the carpenters are concerned, there is a spirit of dissatisfaction and surprise among the rank and file of the workmen, as to the mouse-like outcome of the monster movement which was expected to bring forth such grand results. A feeling of dissatisfaction with the leadership is cropping out here and there; the prevailing sentiment, poorly expressed, is, "If this is all we are to get, we might as well let it alone." Labor agitations, however, never cease; no matter how untoward the result may be, the effort to secure better conditions still goes on, and nothing but a widespread depression, causing disemployment of labor on a large scale, will prevent another concerted movement in another year. Business, on the whole, is improving, and manufacturers feel very confident that the remaining seven months of the year will be better than the past five. An enormous amount of work is on hand in every department of industry, and a vast amount of work remains to be placed. This statement, in substance, is made by the leaders in all the industries. The locomotive-builders have more orders on hand than for two years, and are negotiating for more work than they have ever before had under consideration at one time. The railroad managers generally are preparing to re-equip their lines with everything necessary, and as fast as money can be appropriated for that purpose, they will improve their road-bed.

The entire railway system of the United States is to be put in much better condition. English railway management, in regard to road-bed and equipment, is being more and more followed here, and with excellent results. While only a moderate amount of railway building is being undertaken, a great deal of new work is contemplated. The volume of railway traffic is very heavy, and complaints as to a scarcity of cars are emanating from many quarters. The railroad companies are making every effort to supply all demands, and heavy orders for rolling-stock are being given out from week to week. So far as known, there is not a single well-equipped car-building establishment in the country which has not orders ahead for two to four months. There is a strong probability that freight-car ownership will be consolidated into great equipment companies, controlling cars in large districts. It would seem that some such step as this was inevitable, owing to the great friction resulting from the present feudal system of management and the short-sighted policy which is followed, in disregard of the most urgent business necessities. The iron trade is in better condition than it has been since the first of the year. Plate and sheet iron, steel rails, merchant-bar, merchant-steel and wrought-iron pipe mills are all well supplied with work. The blast-furnaces are producing 180,000 tons of iron per week, every ton of which goes into consumption. Prices have shown an upward tendency during the past few days; large buyers are now covering summer and fall requirements. The production of coal is also increasing, but slowly; stocks are heavy at both Eastern and Western points. The manufacturers of all kinds of machinery report a very heavy demand for both standard and special machines. The steam-power capacity is being rapidly increased, and during the past four weeks a larger volume of business has been placed in this line, among the leading establishments of the New England and Middle States, than has been reported at any time for years. Much of this demand is for heavier, finer and more modern machinery, to replace old designs. The lumber trade is in excellent condition, and prices of hard woods are advancing in all markets. The demand may not be sufficient to lead to an increased production this year, but, if it continues, those who are conducting heavy lumbering operations will increase the sawing and planing capacity for next season. The brick-makers in all sections of the country are crowded with work, and the makers of brick-making machinery report a demand never before equalled. The smaller industries are all thriving, and thus far no serious inconvenience has resulted from a deficient supply of money, although financiers and business managers are constantly apprehensive of some injury to the smaller industrial interests through a sudden scarcity of currency. This fear may be groundless, but it is constantly expressed in trade circles.

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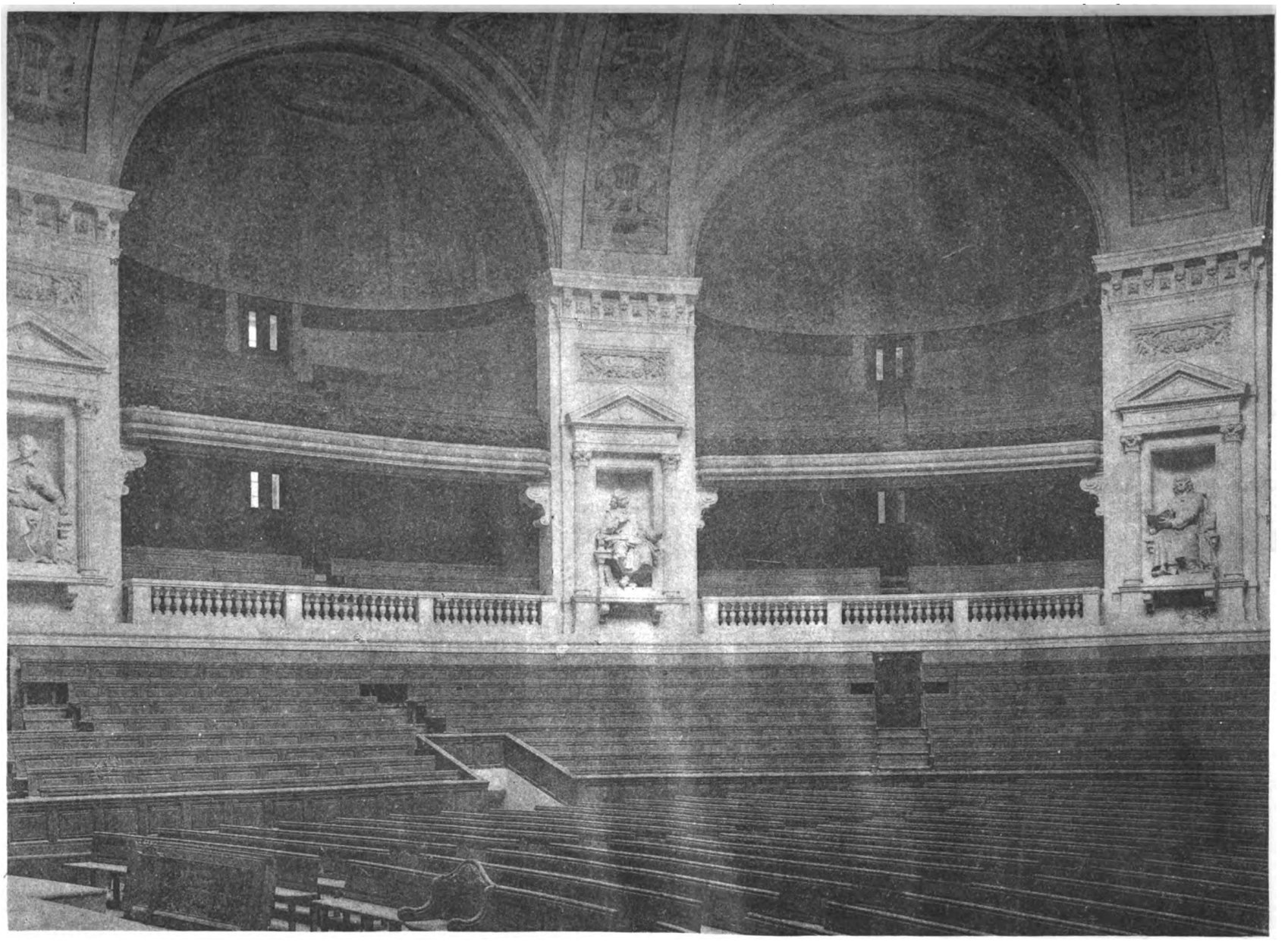

THE GRAND HALL.

THE NEW SORBONNE, PARIS.

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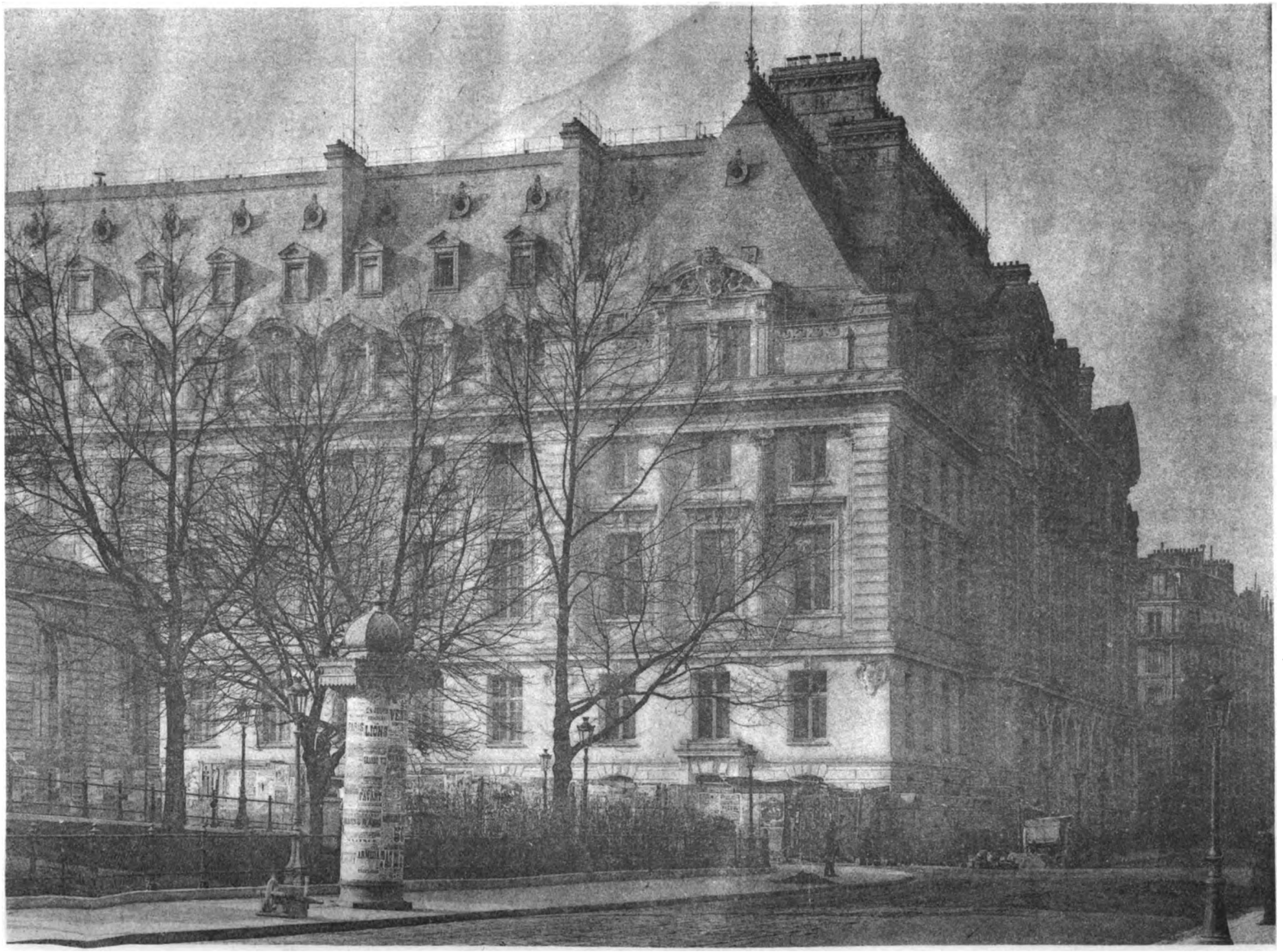

THE FACADE ON THE RUE DES ECOLES.

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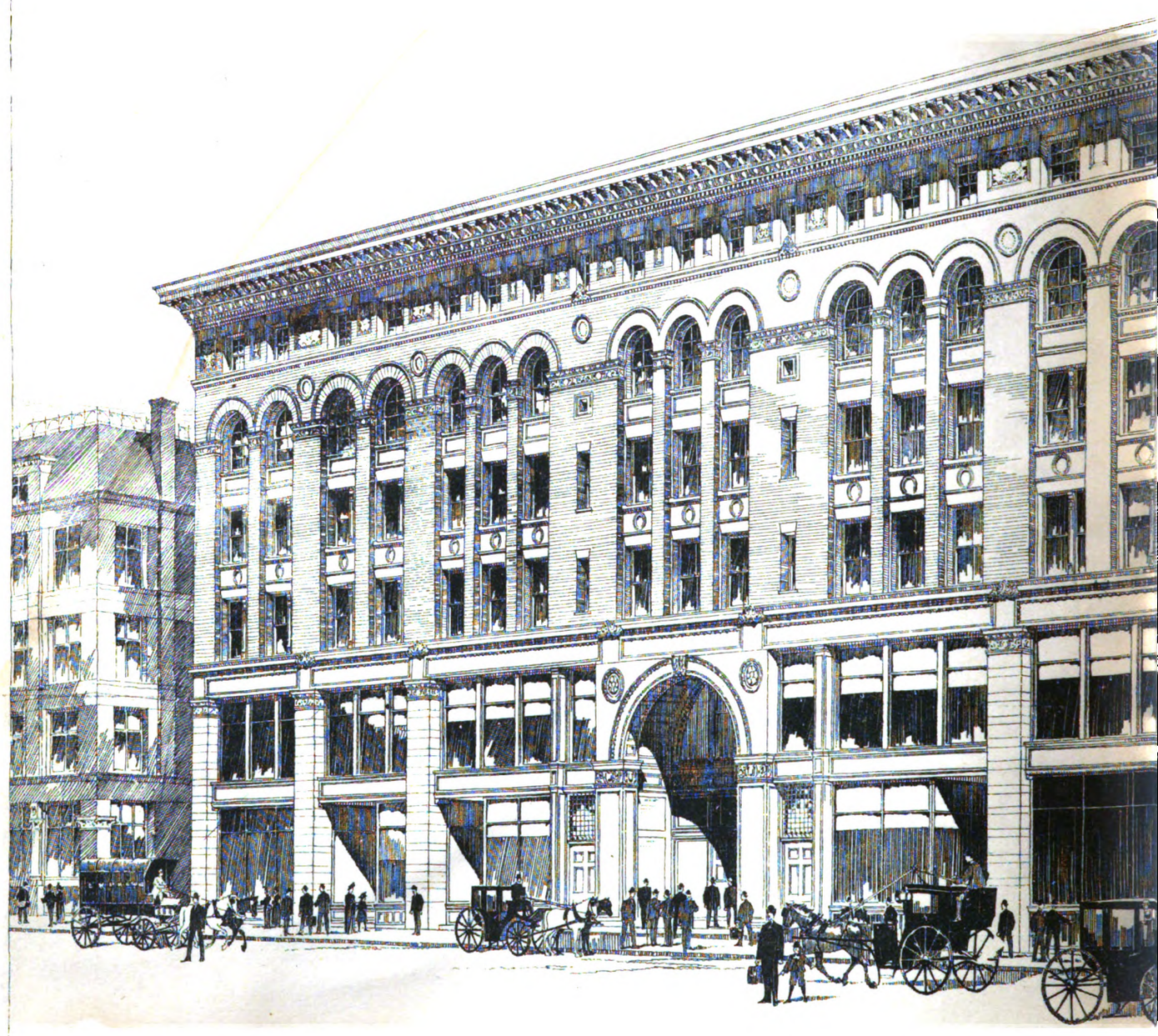
BUILDING FOR EBEN D. JORDAN

KINGSTON, BEDFORD AND COLUMBIA STREETS

BOSTON



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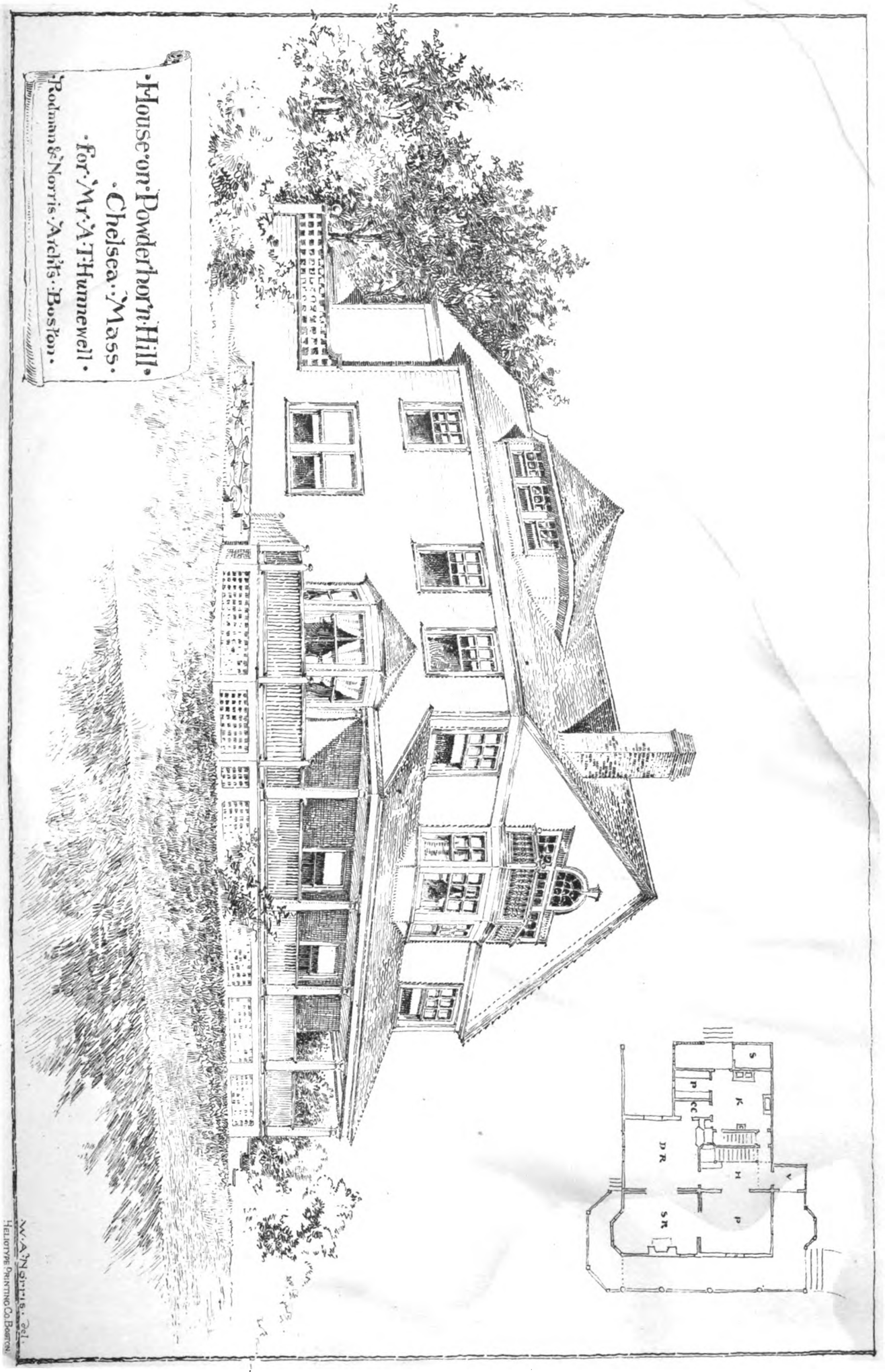

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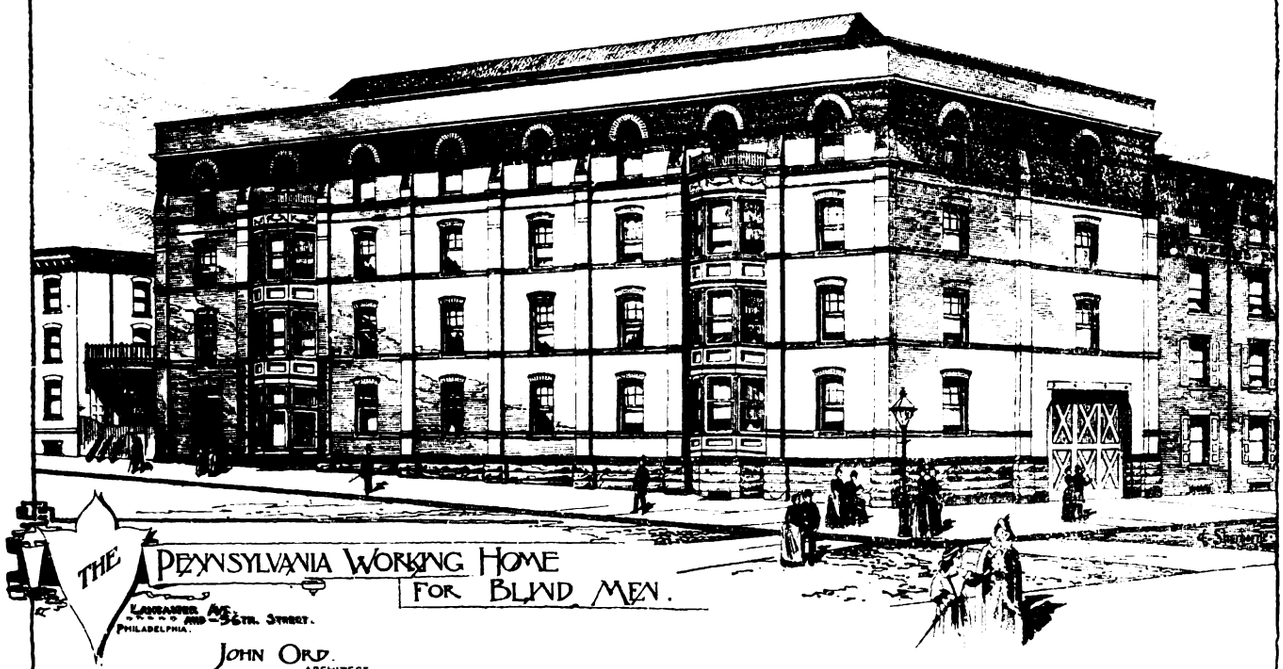
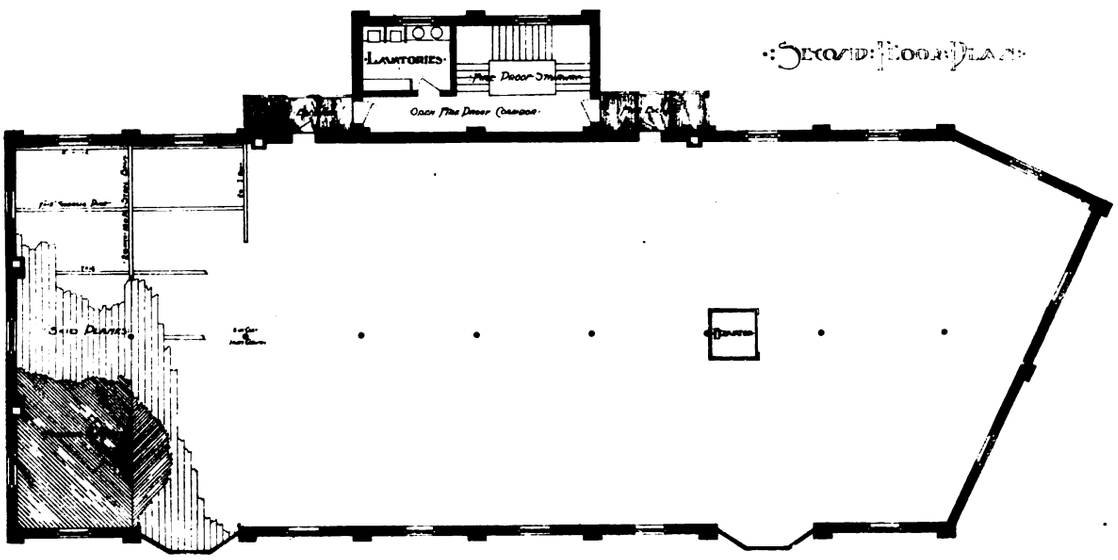


THE PENNSYLVANIA WORKING HOME FOR BLIND MEN.

LANCASTER AVE. AND 58TH. STREET. PHILADELPHIA.

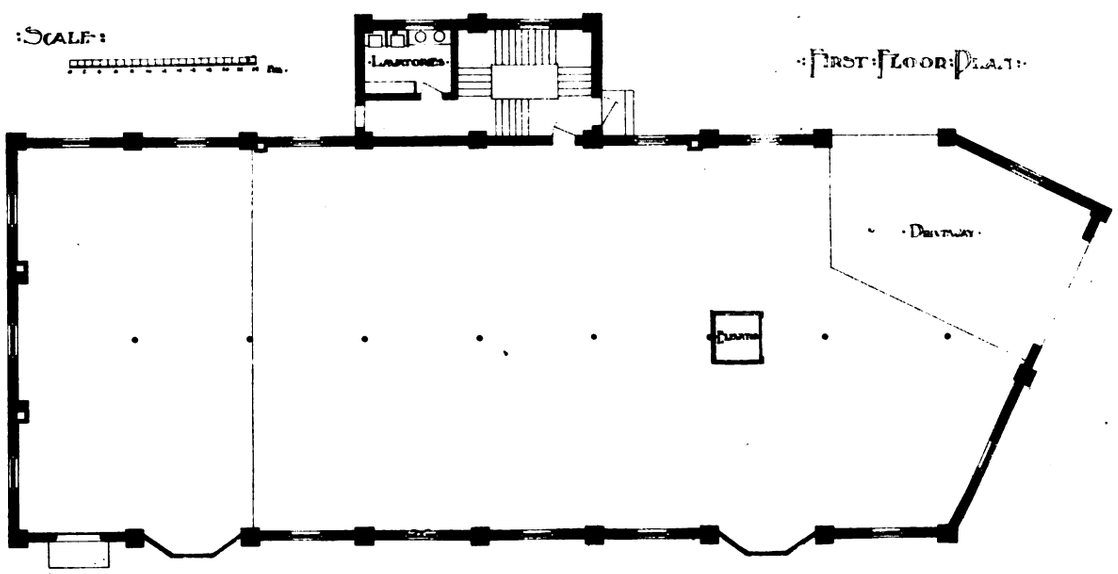
JOHN ORD. ARCHITECT.

SECOND FLOOR PLAN.



SCALE:

FIRST FLOOR PLAN.



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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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JUNE 14, 1890.

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WE are requested to "announce" the Third Annual Exhibition of the works of the students of the Department of Architecture of Columbia College, which occurred on Thursday, Friday and Saturday of last week. We do with pleasure what we can in the matter, and regret that the very pretty card of invitation which accompanied the request, having been addressed to "City," wandered about, according to the postmarks, so long that it did not reach us until our last number was in press.

ANOTHER effort which we trust may be successful, is to be made to secure the necessary money for the purchase, in behalf of the American School at Athens, of the site of Delphi. Dr. Charles Waldstein, the very distinguished Director of the School, is expected to arrive in this country during the present month, and will devote himself to the task of presenting the subject to the public in such a way as to excite popular interest. Dr. Waldstein is not only an American, and a scholar of whom any country may well be proud, but is remarkably successful in awakening the sympathy of the public with his own earnest enthusiasm; and he has the advantage, so far as the American public is concerned, of not being connected with any college. Of course, every one knows that a college official is not necessarily a person of ill-developed manners and questionable attainments, but the idea of college men which is conveyed by the newspaper accounts of the performances in which they figure has not tended to increase public confidence in schemes promoted under their auspices.

A NEW attraction is promised for the Exposition at Chicago, on condition that sixty thousand dollars is raised to pay for it. It seems that a citizen of Alexandria, in Egypt, has most opportunely discovered the corpse of Cleopatra, which he is willing to dispose of for the sum mentioned, and, thinking that the World's Fair Commissioners might be glad to have the opportunity of securing so interesting an object, he has written them, enclosing a sample of the remains, which now consist of bones and dust, the fleshy portions of the corpse having crumbled away as soon as the "sarcophagus" which contained it was opened. Antiquarians will be curious to know how and where this relic was discovered, and it appears that some "archæologists," digging in "Cæsar's Camp," near Alexandria, exhumed the "sarcophagus," which is sculptured with what the present proprietor "positively says" are "images" of Cleopatra. How he knows this is not stated, but he suggests that "any good spiritual medium" can tell from the sample fragment whether his corpse is really that of Cleopatra, so he has perhaps ascertained in this way the identity of the portraits on the coffin. It is said that "the committee thinks very favorably of the proposition," and that "if the sarcophagus is proven to be that containing the bones of the famous queen, the sum asked for will be readily and cheerfully paid." It is hardly necessary to predict that, so long as the committee remains in this disposition, corpses, equipped with spiritual evidence of their identity, will flood the Chicago market. At sixty thousand dollars apiece, the committee can probably soon have its choice among the remains of Agamemnon, whose relics are a good deal better attested than those of Cleopatra, Frederick Barbarossa, Charlemagne, and hundreds of other saints and heroes; while, if it really wishes for authentic relics, it might, perhaps, hire the Saviour's Crown of Thorns, which has been kept in the Sainte Chapelle, in Paris, ever since Saint Louis bought it from the King of Jerusalem for six hundred thousand dollars, and brought it with him, on his return from the Crusades, to deposit in the lovely building which he had had erected for it.

A CONVENTION of Building Inspectors is to be held at the Grand Pacific Hotel, in Chicago, on Wednesday, June 18 next, at 2 o'clock P. M., for the purpose of organizing a National Association of Building Inspectors. All Inspectors of Buildings in the United States are earnestly invited to be present, and it is hoped that a common understanding may serve to increase considerably the efficiency of building inspection in our large cities.

AS our readers will remember, the temporary arch erected at the lower end of Fifth Avenue, in New York, on the occasion of the celebration of the centenary of the inauguration of Washington, from the designs of Mr. Stanford White, charmed the people who saw it so much that a subscription was almost immediately started for the purpose of having it reproduced in a permanent material. In less than a year, money enough has been raised to justify the commencement of the work of erecting the permanent structure, and a few days ago the corner-stone was laid, with appropriate ceremonies, on a foundation previously prepared. Mr. White has somewhat modified his original design, to suit it to the more massive material, and we may be quite sure that the completed monument will be one of the most beautiful things in New York. The situation is a charming one, terminating Fifth Avenue, and separating it from the trees and shrubbery of Washington Square, and the quietness, as well as the modest scale of the surrounding architecture, will add materially to the effect.

THE organized profession in St. Louis has hitherto been represented by a body known under the name of the St. Louis Institute of Architects. What the constitution of this body may have been we cannot say, or whether, like the Boston Society of Architects, it was ever affiliated with the American Institute of Architects; but, for some reason, it has been thought best to form in that city a regular chapter of the American Institute of Architects, which has now been organized and chartered, with Mr. P. P. Furber as President, Mr. J. H. McNamara as Vice-President, Mr. A. F. Rosenheim as Secretary, and Mr. C. K. Ramsey as Treasurer. All these are well-known names, and we do not doubt that the new chapter will hold an important place in the deliberations of the Institute.

WE make no apology for making a few more extracts from Herr Hinträger's very interesting pamphlet on school-houses, which we mentioned recently. After his account of the French school-houses, he describes those of Belgium and other countries. In Belgium, it seems, the movement for improved school-buildings has followed that in France, and French models are generally followed, but with certain differences. In Belgium, for instance, the sexes are not usually separated in the classes, but the schools for the infants, which

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in France are usually joined to those for older children, so that the little ones may go to school under the care of their older brothers and sisters, are in Belgium always in separate buildings. The two most striking peculiarities of the Belgians, their cleanliness and their love of music, show themselves in the provision of music-rooms in many schools, and of wash-rooms in all, even in the villages, where the children can brighten up at intervals their faces and hands. Gymnasiums are also almost always provided, and every school, even the smallest, has a library, and also a museum, for which the pupils themselves collect objects. In the country schools, the teacher and his wife sweep and wash the school-house, which, as Herr Hinträger observes, does not tend particularly to increase their authority over the pupils; but the city schools have regular janitors, and servants under these. The division, as usual on the Continent, is into classes of thirty to thirty-five pupils each, in separate rooms. The area of the playground is fixed at not less than twice the united area of all the class-rooms.

IN Germany, "the land of schools and barracks," we expect to find the most advanced ideas in school-building, and are not disappointed. All, or nearly all school-houses, besides the class-rooms, are provided with gymnasiums, work-rooms, libraries and so on, and, in addition to these, the principal schools in many cities, following the example set by Göttingen in 1884, have bath-rooms attached, in which the children are refreshed with warm or cold shower-baths, as the season may require. The whole school may be washed in a short time by sending the children in relays, and putting two or three at once under each shower; and it is found that their "freshness and enjoyment of study" are greatly increased by the treatment. The last country treated of is Japan. It will surprise most people to learn that Japan, with a population of thirty-nine million heathen, who were, not long ago, little short of savages, has now twenty-eight thousand, six hundred elementary schools, attended by two and one-half million children, besides numerous kindergartens, high-schools, special schools and public libraries. In arrangement, the Japanese schools closely resemble those of France and Germany. The windows are filled with paper, instead of glass; but they have tables, benches, wall-maps and pictures, and a teacher's desk, like a European school. Instead of ink-stands and pens, however, they have sticks of India-ink and brushes, and their writing is done upon sheets of paper, which, from long use, are black, and stiff, like pasteboard, the difference in shade between the moist, newly-made letters and the dry background answering perfectly well for correcting the exercises. For some mysterious reason, the Japanese prefer not to insist upon silence in their school-rooms, and as all the children, therefore, not only "study aloud," but encourage themselves during their writing-lessons by shouting, the consequence is that a school-house is distinguished by the confused roar which issues from it, and can be perceived a long way off.

THE Philadelphia *Daily News* quotes, from an official report of the United States consul at Mannheim, an account of a new process of manufacturing glass, by which the soft "metal" is taken from the melting-pot, and passed between heated rolls, which deliver it in long sheets. According to the account, the rolls are covered with oil, wax or coal-dust, to prevent the soft glass from sticking to them, but the surface of the rolled sheets is smooth, and the glass very clear. If this process should be what is claimed, we may hope to see an immense improvement in the quality of sheet-glass before long, as well as a great reduction in the price of it. The raw material of glass is of very little value, while large sheets, made by the ordinary cylinder process, are expensive, and polished plate is still more so. If glass nearly as flat and smooth as polished plate can be made at one operation, by rolling, it will come into use for a great variety of purposes for which it has never yet been employed.

IN another place in New York the cowardly and criminal warfare against Peck, Martin & Company is going on. Messrs. Peck, Martin & Company, as our readers know, are dealers in building materials, who have the audacity to employ non-Union men. For this reason, and because they have been independent enough to refuse to discharge their men at the demand of the walking-delegates, they have been persecuted for two or three years by every sort of malice that the delegates could think of. Some of the delegates have already got themselves into jail by their excessive zeal in tormenting people who chose to employ poor men whom the same delegates wished to prevent from obtaining employment, and the zeal of the rest has been limited only by their fear of the police. The way in which their attacks are made has been to order strikes at intervals in all buildings where materials bought from Peck, Martin & Company are used. The other dealers in materials have shown their opinion of the contest by agreeing not to sell any materials to replace those which Peck, Martin & Company have been prevented from selling, and the consequence is that in one of the buildings in New York, where the unfortunate firm of friends of the oppressed have been engaged to furnish materials, there is total stagnation, no workman daring to appear for employment. It is not many years since there was a strike of railroad men in New York State, the consequence of which was that Governor Hoffman, of energetic memory, immediately seized the railroads, put them under military guard, and operated them as usual, by the State authority, until the strike was settled, which, as the ringleaders found their means for tormenting the public taken out of their hands, soon happened. The Spanish Governor of Barcelona took another step in advance last month, by putting the factories in his city under martial law, and ordering that strikers who tried to interfere with non-Union men and women should be shot without ceremony; and it looks as if the public force would, before long, have to be called in to protect that portion of the citizens which has the misfortune to be employed in the building trades.

AS the summer advances, the people who conduct the wretched game of strikes grow more reckless, and those whom they govern less tractable. In New York, the other day, the house smiths and framers engaged in a certain building took offence at something, and appealed to the Central Labor Union to order the building "struck" by all the workmen in it. The bricklayers employed in the work, who had nothing to complain of, objected to being thrown out of work, but the Central Union voted to strike the building, whether they liked it or not. The bricklayers then expressed their intention of keeping at work, notwithstanding the action of the Central Union, and took their places on the staging the next morning, as usual. Pretty soon a walking-delegate appeared. He was much too wary to approach the bricklayers, who, when they happen to take it into their heads, are as reckless as the delegates themselves in enforcing their views on other people; but, instead of this, slipped down into the basement, where he found the engineer of the hoisting apparatus by which bricks and mortar were lifted to where the bricklayers were at work. As the Engineers Union belongs to the Central Labor Union, the walking-delegate was enabled to bring all the terrors of the united trades to bear upon him, and he soon frightened him into quitting his engine, leaving the bricklayers without bricks or mortar until a non-Union engineer could be found, with courage enough to take his place.

A DECISION of importance to architects has been made in the United States Circuit Court, in the district of Massachusetts, in relation to the patents for electric gas-lighting apparatus. The litigation has been going on for several years, to determine the validity of certain patents for electric hand-lighting gas-burners, having a fixed electrode, a ratchet on the valve-stem, and an angle-lever, which is fitted loosely on the stem, with one arm for operating, by means of a chain or cord, and the other arranged to carry an electric contact-point past the burner-tip, and carries a pawl, to engage with the ratchet and turn on or shut off the gas. These familiar details are common to burners made and sold by many dealers and electricians, but it has now been decided that the devices of which they form part are covered by certain patents, now the property of Mr. A. L. Bogart, of New York, and the Electric Gas-lighting Company of Boston, and that the patents are valid; so that henceforth only these two parties, and their licensees, can manufacture or use such goods until the expiration of the patent. Who the licensees are we are not informed, but as architects and their clients often get into trouble by the innocent use of articles which turn out to infringe some one's patent, we advise people in the profession either to refrain entirely from using apparatus of the sort, or to require from the contractors furnishing it a satisfactory warranty that all the just demands of the proprietor of the patent have been complied with.

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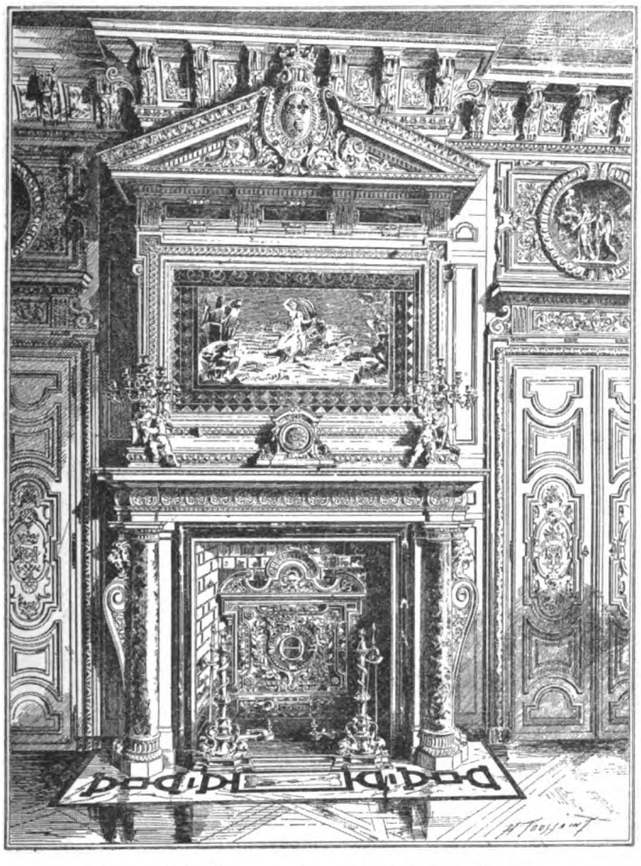
RELIGIOUS ARCHITECTURE.[1] — X.

V. CHRISTIAN ARCHITECTURE. — THE BYZANTINE PERIOD.



Chimney in the Chateau de Chantilly. M. Daumet, Architect.

DURING the early centuries of the present era, Christianity was the religion of the "lower orders" — of converted Jews who had come to Rome to carry on the inferior crafts, and of the Syrian population of cosmopolitan cities, and of a vast number of slaves. From the days of Nero, the professors of the new faith were often subjected to persecution, and their tenets were held in especial contempt by the Roman aristocracy, as may be learned from the study of the Latin authors of the period. The erection of important religious edifices in the open air was out of the question for the early Christians. Long forced to hide their worship, or, at least, to avoid calling attention to it, the fire of their belief was kept alive in the catacombs, which were either abandoned quarries or underground galleries excavated to serve as assembling halls for Eucharistic celebrations and for common prayer, as well as for burial-places for the dead and the martyrs.

These galleries were veritable labyrinths, with paths running in all directions, and with tiers of deep niches made in the walls to receive the dead. Each niche, when used, was closed by a stone slab, on which a palm was rudely graven with a trowel, or in which was fixed an ampulla filled with the blood of the martyr.

In many cases there are several stories in the catacombs, ranging one above the other, and inter-communicating by means of stairs. From point to point, where the paths meet, vent-holes hidden under the briars let a little light into the interior, and wells are found extending down to subterranean pools, which supplied the water needed for baptisms. It is near these vent-holes that fragments of pagan tombs have been discovered; their position has led to the belief that they must have fallen in from without, and it is supposed that the catacombs have always served exclusively for Christian ceremonies.

The rapid spread of Christianity into all the provinces of the Roman Empire, the cessation of persecutions in the fourth century, and the adoption of the new worship as the official religion by Constantine, are events known to all the world. When, about 330 A. D., Constantine transferred the seat of government to Byzantium, the Oriental city became the capital of the Christian world.

With the zeal of an imperial neophyte, Constantine caused many of the edifices of antiquity to be destroyed, and erected Christian churches on all sides.

With the beginning of barbarian invasions in the West, civilization, heir of the ancient world, turned once more toward the East. The cities of Greece and Syria, like Constantinople herself, reared countless religious structures. The Eastern Empire reached the zenith of its power in the sixth century, under Justinian, who built the Church of Saint Sophia as it has come down to us. It sustained itself until the ninth century, after which it gradually declined under attacks from West and East alike, until in the fifteenth century the Turks fixed their capital at Constantinople.

During the flourishing period of Byzantine rule, Christian churches continued to be erected throughout the empire — in Asia Minor, and in Greece.

The history of the struggles of the Eastern Empire against various barbarian invasions is well-known; the stories have often been told, also, of the triumphs of the Greek Empire in Italy, and of the final establishment of the Longobards in Italy, as of the Franks among the Gauls; of the attempts of Charlemagne to reconstruct the Western Empire; of the establishment at this period of regular and frequent intercourse between the Occident and the Orient, and of the consequent influence exercised by the ancient civilization over that which was in process of formation. It is not to be wondered at, then, that Byzantine architecture, engendered by ancient art and metamorphosed to suit new needs, had almost universal sway until the tenth century.

We shall find traces of it in Western Europe down to a comparatively recent date.

With Christianity came ceremonial demands quite unlike those of paganism; vast halls were required for processions and other ample rites, as well as for the assemblage of the faithful and the clergy for common prayer. Two of the Roman edifices, to wit, the rectangular basilica and the circular hall, were found well adapted to answer all the requirements of the new forms of worship. These structures were taken as models in the construction of a large number of churches. But to these a third type was added, which was peculiar to Christian architecture, and the origin of which is to be sought in the Church of St. Sophia, erected at Constantinople under Justinian.

We can henceforth rank all examples of religious architecture in one of these three groups — basilicas, circular temples, and churches with domes resting on pendentives — down to the moment when, during the so-called Romanesque period, the West, having reached a sufficiently advanced state of civilization, escaped from Eastern inspiration and created a new style of Christian architecture, the Gothic.

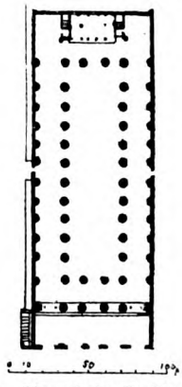


Fig. 1. Plan of the Basilica of Pompeii (1st Century B. C.).

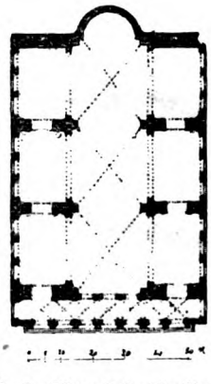


Fig. 2. Plan of the Basilica of Constantine, at Rome (4th Century A. D.).

We will point out the main characteristics of the three groups noted above, and will then indicate, with greater detail, the edifices erected during this period, in the East and West alike, by Byzantine architects, or under their influence.

The form of the Roman basilica was well adapted to the needs of the crowded Christian assemblies. The long, vaulted halls of the thermæ would have answered these needs equally well, but their construction was far more difficult and costly.

According to Vitruvius, the most important Roman basilicas had *chalcidica*, which were probably aisles running crosswise,

[1] From the French of P. Planat, in Planat's "*Encyclopédie de l'Architecture et de la Construction.*" Continued from page 145, No. 754.

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either at the entrance or in front of the tribune, or *prætorium*. This disposition was copied in the oldest Christian basilicas, St. John Lateran and St. Peter's, at Rome, and also in the basilica of St. Paul, when it was reconstructed under Theodosius.

The aisles, or lateral naves, were often surmounted by lofty galleries, opening on the central nave by a second order of columns three-quarters the height of the lower order. The intercolumniations were closed three-quarters of the way up by a partition, called the *puteum*. Above the whole, an attic, adorned with pilasters, supported the timber-work of the roof, for such was the usual method of covering the structures of this period. However, a few basilicas existed, like the Temple of Peace, or Basilica of Constantine, at Rome, built, in fact, by Maxentius, in which the different naves were vaulted (Figure 2). In such edifices, massive piers were used instead of columns.

At first, lintels were employed to span the spaces between the columns supporting the walls of the principal nave; this necessitated the use of a considerable number of columns, as only a comparatively small superincumbent weight could be borne by the lintels. Columns were freely transferred from the ancient edifices to the new; however, when these became more scarce, the arch was substituted for the lintel.

The ancient basilica comprised a main nave carried on columns, and two lateral naves, or aisles, supported on the side walls; on the principal façade were three doors corresponding to the three interior divisions. The central nave terminated, at the head, in a semi-circular recess answering to the *prætorium* of the civil basilica of the Romans. Sometimes, however, this recess was wanting, and the *prætorium* formed a part of the hall itself, as in the basilica of Pompeii (Figure 1).

The side-aisles were sometimes doubled, as in St. Peter's, and St. Paul's without the walls (Figures 5, 6). They were

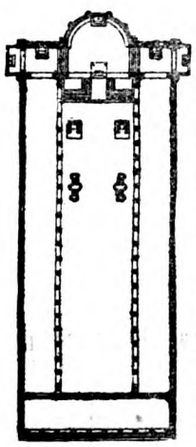

Fig. 3. Plan of S. Maria Maggiore, at Rome (5th Century).

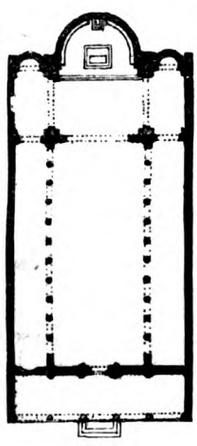

Fig. 4. Plan of S. Pietro in Vincoli, at Rome (5th Century).

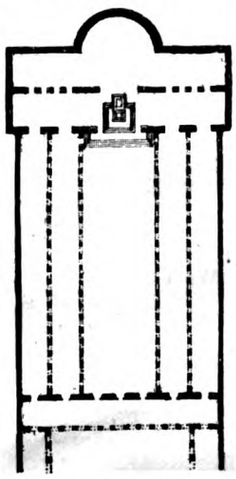

Fig. 5. Plan of St. Paul's without the Walls, Rome (5th Century).

often of two stories, as at S. Agnese (Figures 7, 8), and at S. Lorenzo, where, also, there is a tribune on the inner face of the front wall.

The pronaos at the foot of the principal nave was designed for the catechumens and penitents, who were not allowed to listen to all of the service, but were compelled to leave the church at the time of the consecration of the host. The lower clergy, constituting the choir, were stationed in the centre, a place afterward termed the choir; the space about the altar, which stood at the entrance to the semi-circular recess, near the *altarium* or *sacrarium*, and which was often closed in on the sides by solid walls, was occupied by the deacons and sub-deacons; the higher ecclesiastics sat on a semi-circular bench in the apse, designated under the name of *presbyterium;* while in the middle was the *consistorium*, a raised seat reserved for the episcopal authorities.

The worshippers were in the aisles, the men taking the left as they entered, and the women the right; these directions were sometimes reversed, as they were dependent on the orientation of the edifice. It was a rule in early times that the churches should be so set that the priest should face the east at the consecration of the host; as he turned at that moment toward the assembly, the men should be on his right; that is, on the south side of the house. This law, which was fixed by one of the Clementine constitutions, was not always observed, and more than one of the basilicas was set differently. S. Clemente and St. John Lateran may be cited among those regularly oriented.

From the fifth century, it became a rule for the priest to turn his back on the worshippers; the churches were then built to front the west, and the men took the right and the women the left on entering. The basilica of S. Apollinare, at Ravenna, is oriented in this way. Therefore, in the mosaic

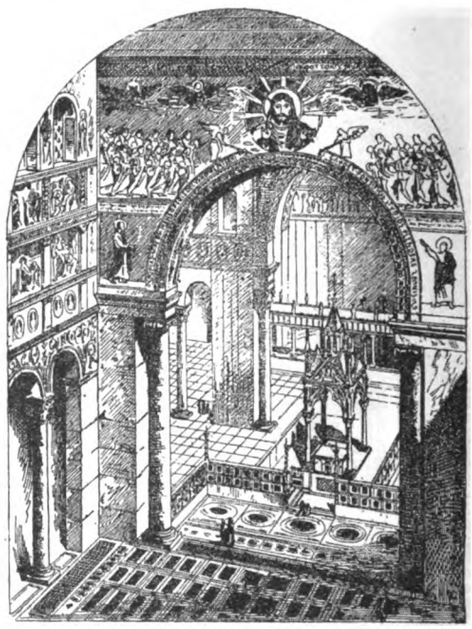

Fig. 6. Interior of St. Paul's without the Walls. After M. Rohault de Fleury.

frieze, with which the interior is decorated, the female saints are represented on the northern wall, the women's side, while the figures of the male saints are found on the southern side.

In the Roman civil basilica there was often, either at the entrance, or toward the rear, in front of the *prætorium*, a transverse hall, which, as we have already remarked, must have been the *chalcidicum* mentioned by Vitruvius. In the fifth century this disposition was revived under the name of transept, and by its means an ampler, better defined and

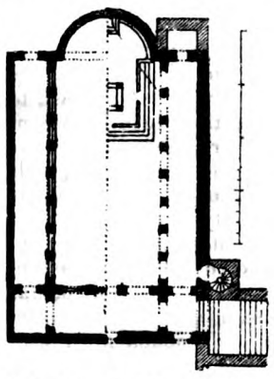

Fig. 7. Plan of S. Agnese without the Walls, Rome (7th Century).

Fig. 8. Interior of S. Agnese without the Walls.

more isolated space was secured for the sanctuary. The wall of the transept was pierced by broad bays corresponding to each of the naves; the central one took the name of *arcus maximus* or *triumphalis*. The wings, arms or cross-bars of the transept often extended beyond the side walls, so that the general form of the church was that of the Greek *Tau;* a symbolical expression was attached to this letter because its shape was that of a cross.

The transept sometimes terminated in small apses.

Thus three well-defined types are to be found, to wit: the basilica without a transept, like S. Agnese (Figures 7, 8); the basilica with a transept: (1) with a single apse, as S. Maria Maggiore; and (2) with three apses, as S. Pietro in Vincoli.

[To be continued.]

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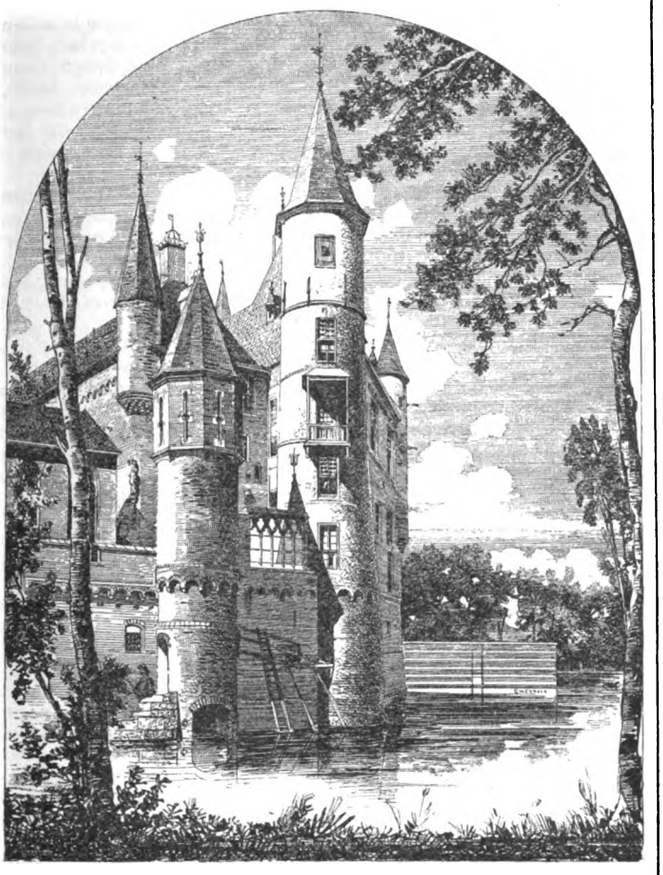
THE GREAT TOWER IN LONDON.



Schloss Heeswijck, Holland.

IS London to have a great tower of an altitude equal to or surpassing that raised by M. Eiffel in Paris? Sir Edward Watkin and his friends say that it is, and few engineers will be disposed to raise objections, for considerable scientific interest attaches to such erections, while they provide work for iron and steel manufacturers, engine and lift makers, and many others. At the same time, it must not be forgotten that it will not be sufficient that the proposed tower shall be well and scientifically constructed, and that it shall reach a few hundred feet further skyward than the erection on the Champ de Mars. If it be not also a commercial success, the effect will be felt in engineering circles, and the public will be, for a time at least, on their guard against all novel enterprises. There are plenty of people always ready to throw a stone at an unfortunate undertaking, and if this should not succeed there will be no hiding it. It will expose its forlorn length to every passer-by, and advertise its own failure in the most effectual fashion possible.

This consideration needs to be borne in mind in the choice of a design. M. Eiffel's venture proved a great financial success, but it by no means follows that it would be wise to imitate it very closely on the banks of the Thames. Even he must at times have regretted that he had not provided greater facilities for ascending and descending, and more space at the summit, so that the traffic through the turnstiles might have been quicker. Fortunately for him, Paris was, last summer, the focus of all the pleasure-takers of the world, and was filled with crowds having time on their hands, and money in their pockets which they were anxious to spend. There is no likelihood that such a state of affairs will ever occur in London to the same extent. The millions who attended the last Exhibition at South Kensington were largely composed of people who deferred coming until the entrance-fee was practically reduced to a few pence, and very few of them would have paid three or four shillings to ascend a tower, even if it had reached to the clouds. We doubt even whether the well-to-do English people who crowded up the Eiffel Tower so readily would not count the cost much more carefully in their own country.

The London tower, if it is to pay, must provide for the Londoner some attraction which will bring him again and again. Few people will care to go to a height of 1,000 feet more than once, while immense numbers will postpone the journey for the convenient season which so seldom comes. Yet it has been demonstrated that outdoor pleasures — trees, flowers and music — will draw, all through the summer, crowds who are quite content to talk, smoke and promenade, and who will neglect the treasures and curiosities of an exhibition for the sake of the fresh air. Now, if these attractions could be raised 200 feet or 500 feet above the smoke and the dust-laden air, they would be immensely increased, and every evening there would be a rush both of the gay and the jaded to enjoy a new sensation, which would never pall so long as the summer weather continued. The country cousin and the conscientious sight-seer would go to the summit, but the first stage would detain the bulk of the visitors.

We think that considerations of this kind will weigh with the committee who have under review the form of the proposed tower. To facilitate their labors, two prizes of 500 guineas and 250 guineas respectively were offered for the best designs last November, and, the time allowed having expired, the designs await adjudication. For the present, they are being exhibited to the public in the hall of the Drapers' Company, Throgmorton Street, E. C., where they will be on view till Friday, the 9th inst. The competitors were not hampered with any restrictions; they could choose their own height, style of construction and material, and all that was demanded was that there should be sufficient lift power and space for restaurants and offices. To show how far advantage has been taken of this latitude, we may mention that the heights of the designs vary from 1,197 to 2,007 feet, while both granite and concrete towers are suggested in addition to those of steel and iron. Of course, the majority of the candidates prefer steel.

In reviewing the various designs, we must frankly admit that none excels the Eiffel Tower in beauty and grace. We fancy the candidates must have often bemoaned the fact that they were the second, and not the first, to undertake this class of structure. The plan of building a column on four splayed legs merging into a vertical, square shaft is so evidently the best, that the choice lies between plagiarism and retrogression. Of course, the four legs may be changed to three, or six, or eight, but the principle remains the same. Most of the good designs follow these lines, which, from a structural point-of-view, are certainly correct. A few competitors, however, and notably among them Mr. Max am Ende, have offered towers of architectural design, some of them being of very considerable beauty and grandeur. On paper, these are very striking for their solidity and apparent massiveness, but we doubt if this appearance would be associated with the actual structure. The essence of art is truth; any material, stucco even, may be made decorative and beautiful if it be used in a way that frankly acknowledges its nature, and does not endeavor to represent it otherwise than it is. Now, if these towers were covered with plates, the mind would recoil from them as shams, while if they were to a great extent open lattice-work we fear they would jar on our sense of congruity. The essence of a masonry tower is solidity, and, with this preconceived idea in our minds, we should find ourselves unsatisfied by an open and airy structure. It is said that some of the early buccaneers struck terror into their victims by hoisting sails of network, through which the moonbeams streamed, giving the impression that the vessel was the "*Flying Dutchman.*" We imagine a lattice-tower of architectural form would have a somewhat ghostly effect at night.

Besides the two classes of designs we have mentioned, there is a group of what may be called the Perpendicular style. By this we mean they are built up of vertical pillars tied together with cross-bracing. There are usually several rings of these pillars. The centre rings mount to the summit, while those nearer the periphery are stopped off at lower levels, thus forming a tower whose diameter decreases by steps, each step forming a deck or gallery. In some cases a winding road leads round and round from base to summit, thus forming the Tower of Babel of the picture-books. These designs give an enormous amount of accommodation, but they are necessarily heavy, and would require an excessive amount of cross-bracing to withstand the wind-pressure.

Lastly comes the miscellaneous group, with more sub-sections than we care to count. Many of these are utterly impracticable, and in others the question of expense has never been considered. The estimates which were to accompany each design are not exhibited to the public, and we fear that many of them are merely wild guesses. It is most difficult in many cases to gather the constructive details from the drawings, and very few carry any dimensions except the height of various galleries, so that only a general idea can be gathered as to the sufficiency of the structural arrangements. Many are absurdly light, while others contain an unheard-of quantity of material. Speaking generally, those that have the most graceful appearance are sadly lacking in accommodation, while those that provide ample space and to spare are supremely ugly.

In the first class, those supported by ribs or legs running from base to summit, we find several very good designs. Early among these, following the order of the catalogue, is that of Mr. H. Fidler, of Grove Park, Chiswick, London. The tower is of steel, 1,200 feet high, with a base 500 feet square, cruciform in plan. Through the centre of the cross there rises a square steel lattice-mast, which serves for the hoists, while a staircase is built round it. Semi-circular arches are thrown in between the legs. At the upper part, the four legs merge into the central mast. There are four galleries at heights of 280 feet, 560 feet, 840 feet and 1,120 feet, the first being 250 feet square.

From Messrs. Kinkel & Pohl, of Washington, there comes a handsome design of a tower 1,250 feet high on the very narrow base of 192 feet. The skeleton contains sixteen lattice-legs and a central tube. Between and around the feet there is erected a very large domed building 400 feet high, containing an immense central hall and many galleries. There are in all eleven galleries. The elevation of the building is very handsome, and it promises ample accommodation for all purposes. A curious design appears under the initials "WP." It is 1,200 feet in height, with a base of 310 feet.

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There are six members grouped around a central cylindrical lift-tube, to which they are tied by bracings and by four platforms. Each foot is mounted on a rocking bearing on the top of a masonry foundation, and the whole is exceedingly light, and apparently wanting in rigidity.

A very good example is sent by Mr. E. S. Shaw, of Boston, U. S. A. From a base 500 feet square there spring four tubular columns grouped around a central tower, which stretch from the first platform, and into which they eventually merge, the whole rising to a height of 1,400 feet, and being of 100 feet diameter at the top. This design has a general resemblance to that of M. Eiffel, but the details are very different. Mr. T. V. Trew's tower resembles a light-house constructed of lattice-work, its profile being just that rendered familiar by pictures of the Eddystone and other beacons. It has eighteen lattice members, tied together by crossed spiral ties, running round the outside. There are four intermediate decks between the base and the top gallery at heights of 300 feet, 460 feet, 600 feet and 800 feet respectively. The outline is not broken by any galleries until the lantern is reached.

One of the triangular designs bears the well-known name of Mr. J. I. Thornycroft, of Chiswick. This is 1,760 feet in height, and each member is a steel tube, these tubes uniting in one near the top, and having a spiral staircase outside, while the lifts are inside. The three legs are united below the first platform by arches, there being four platforms in all. This design looks very artistic on the drawing, but it has the defect common to all three-legged structures that, viewed from certain positions, it does not appear symmetrical. We think this would be a fatal objection to this and all the cognate designs in the exhibition, since they have a lop-sided appearance which is quite incompatible with beauty. This is a matter of regret, as many of the tripodal designs are very handsome.

Monument to Guatemozin, City of Mexico. Francisco Jimenez, Architect and Sculptor.

An eight-ribbed tower, 1,300 feet in height, and on a base of 310 feet, is shown by Mr. W. H. Woodcock, of 6 Victoria Street, Westminster. It contains a central octagonal mast, and has three intermediate decks between the base and the top. The design is simple and neat, but the straightness of the sides give it too much the appearance of a simple cone. Mr. J. H. M. Harrison Vasey, of 20 Vicarage Terrace, Sunderland, has endeavored to supplement the scanty accommodation of the Eiffel Tower by carrying up four large struts from the first platform, and erecting a second gallery upon them equal in area to the first. While this is a decided improvement from the gate-money point-of-view, it has entirely spoiled the beauty of the design. The tower is 1,820 feet in height and stands a square of 800 side.

A design for a tower of 1,280 feet comes from America, bearing the well-known names of Mr. T. C. Clarke, Professor Joseph Mayer and Mr. W. Hildenbrand. The main skeleton is hexagonal, with the base carried out in square form. The upper part is circular, with a spiral staircase outside which suggests the Column of July. The design is pleasing in elevation and structurally very good, but scanty in accommodation.

Mr. C. Lean, of Palace Chambers, Westminster, sends a design for a 1,200-foot tower, comprising six legs, straight on the outside and converging to the top. It is an exceedingly simple design and has five intermediate decks. Mr. P. Campanakis, of Constantinople, shows a design which recalls the appearance of the Paris tower, except that it is triangular. The height is 1,197 feet, and exhibits a considerable amount of decoration. Next to this is one much like it, the author's identity being hidden under the motto "Time is Money." In this there are not only arches below the first gallery, but also under the second. An enormous clock with three faces forms part of the design, which is highly decorated. Mr. J. C. Chapman's tower is 1,200 feet in height and has six ribs. The contour is not a clean sweep from base to summit, but the line is broken and changes its direction at each intermediate gallery, of which there are three. A plain example of the light-house style of design is sent by Mr. J. T. Bateman, of 11 Beulah Road West, Thornton Heath, Surrey. It has six ribs which run in a single sweep from base to lantern. There are four galleries at heights of 200 feet, 500 feet and 800 feet, the total elevation being 1,260 feet. The design is a simple and cheap one to carry out.

The combined design of Mr. A. D. Stewart, Mr. J. W. Maclaren and Mr. W. Dunn, is a plain steel tower, having an octagonal base of 300 feet in diameter, and a height of 1,200 feet. There are four galleries at heights of 200 feet, 550 feet, 850 feet and 1,040 feet. Each leg is a square lattice frame, and the whole forms a strong and simple design, while Mr. Stewart's name is a guaranty of the good construction.

Mr. A. F. Hills, of the Thames Iron Works, soars heavenwards 2,007 feet, his design being a gigantic obelisk buttressed by struts which cover a base 644 feet square. The structure contains fifteen floors, and is named "Ye Vegetarian Tower," to the bewilderment of visitors who fail to see the aptness of the appellation. A central cylindrical mast, parallel for 800 feet, and supported sideways by flying-buttresses arranged in tiers and springing from one another, is the design of Mr. J. Tertius Wood, of Rochdale. The shaft carries lifts and a spiral roadway, and around it are built decks at heights of 200 feet, 400 feet, 600 feet and 800 feet. This plan of planting curved struts on one another does not fulfil either artistic or constructional requirements.

Mr. Robert Wylie's (Liverpool) tower is 1,470 feet high, including a masonry base of 60 feet. Its general appearance is much like that of the Eiffel Tower. Near it is a design by Messrs. Harper, Harper & Graham, of Birmingham, of which the same may be said, except that this latter instead of being on a square base is composed of two equilateral triangles forming a hexagonal star. The height is 1,300 feet.

An octagonal tower is exhibited by Messrs. W. Vaughan and W. H. Tomkins, of 64 Broad Street Avenue, E. C. Each leg is composed of three steel tubes braced together. There are eight of these legs curved outwards at the base; the general effect is pleasing. A very good example of an octagonal steel tower is shown by Mr. J. J. Webster and J. W. Haigh. Around the foot of each leg is built a large structure like an hotel, the upper stories of these buildings being continuous and reaching to a height of 200 feet. The bottom of the tower is thus masked, and its upper part springs out of a group of handsome buildings, the general effect being very good.

Next to this is a tower by Messrs. Rendel, Findlay & Ricardo. It is 1,260 feet high, on an octagonal base, occupying 46,000 square feet. The base is an immense glass-covered dome, laid out as a winter garden, while the shaft is formed by successive cylindrical columns, of decreasing diameter. A spiral road leads round these. This design provides very considerable accommodation, but it is mostly on or near the ground.

Mr. Henry Davey's design embraces twelve straight steel columns braced together to form a rigid truncated cone. Each column is buttressed at about one-third of its height by a raking strut which is masked by curved lattice girders which hide the straight lines and give a double curved outline to the base. At the top of the cone is mounted a tower of the light-house pattern, inside which is a staircase leading to the lantern.

Messrs. Read & Shuffrey, of 38 Welbeck Street, show a steel tower 1,475 feet in height, which is very like that built by M. Eiffel.

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It has platforms at 200 feet, 800 feet and 940 feet in height. A good design is shown under the motto "Equilateral Triangle." It is 1,475 feet in height, and has a hexagonal skeleton sustained by six curved spurs. Each leg is formed of four members arranged in a square and braced together. The curves are pleasing. There are three intermediate platforms between the ground and the summit.

The joint design of Prof. Robert Smith and Mr. W. Henman, is a kind of three-legged Eiffel Tower. The height is 1,400 feet. Each leg consists of a tube 30 feet in diameter at the ground level, the centres of the tubes being 350 feet apart.

Messrs. Francis Fox & G. E. Grayson offer a design of a tower of 1,300 feet in height, and having a base of 370 feet in diameter. It is formed of eight straight tubes, each supported at about half its height by a lattice raking strut. The general appearance is good, but there is a great want of accommodation for visitors. Probably this could be remedied. Under the motto of the "British Lion" is shown a steel tower 1,200 feet high, with a hexagonal skeleton. The appearance of the design is good.

Turning now to the towers which more or less simulate masonry, the first is by Mr. W. P. Gibson, of 15 Queen Street, E. C. It is designed on the general outline of Sir Christopher Wren's spire to Bow Church, Cheapside, and so should appeal very strongly to all cockneys. The height is 1,232 feet. "Acme" sends a design for a tower of 1,300 feet, square in plan, which in itself recalls the clock-tower at Westminster. But it is stiffened by four radial trussed buttresses, which suggest that it has been condemned by the surveyor as a dangerous building, and has been ordered to be shored.

The handsomest of all the architectural designs is that of Mr. Max am Ende. It is 1,550 feet in height, of a Gothic design, constructed entirely of steel. The platform at 1,000 feet is treated as the principal one. Subject to the general objections we raised above to the imitation of masonry in metal, it is impossible not to admire the design. It is entirely original and exceedingly artistic. A 1,296-foot tower, also not unlike the clock-tower at Westminster, is shown by Mr. J. S. Fairfax, of 433 Strand, W. C. This is another handsome architectural design.

The group which we have named the Perpendicular is a large one. At the head of it (No. 1 in the catalogue) comes a tower of 1,355 feet by Mr. M. T. Otis, of Rochester, U. S. A. On a square base of 400 feet side, there is erected a many-story construction, carried up parallel. In the centre of this rises a second square structure of smaller size which serves as the base, at a height of 350 feet, for a square light-house-like tower. It is proposed to employ bolts instead of rivets throughout. This design supplies abundant accommodation on the numerous floors in the lower portion, but it is not beautiful. For thorough-going ugliness the tower with the motto "Circumferentially, Radially and Diagonally Bound," bears away the palm. It resembles a series of reels of cotton of gradually decreasing size placed one above the other, and surmounted with a wax taper from a Christmas tree. The height is 1,600 feet, and the successive diameters 280 feet, 240 feet, 200 feet, 160 feet, 120 feet, 80 feet, 60 feet, 40 feet and 20 feet.

Mr. S. Fisher, of Eagle Wharf Road, London, exhibits a design which is a veritable Tower of Babel. It is "2,000 feet or less" in height, and about 650 feet in diameter at the base. It is built of square pillars, in thirty-one stories, each story being less in diameter than the one above it. Around it runs several spiral roads.

The "Century" tower stands on a base of 400 feet in diameter and is 1,900 feet high. There are three stories in the base, decreasing in diameter by steps, and from the third there springs a slightly tapering shaft, like a factory chimney. It is 50 feet in diameter at the top, and is surrounded by a spiral path of easy gradient, which gives it the appearance of a gigantic screw. The design sent by Sir Bradford Leslie, of Willesden Lane, N. W., recalls to our memory that he has a reputation as an engineer of being able to carry out plans with very simple and cheap materials. He has certainly allowed this idea to dominate his design. This tower is 1,200 feet high in four equal stories of 300 feet each. The first deck is mounted on three circles of columns. The second deck is also carried on three rings of columns, of which the outer ring is over the middle ring of the first story, the middle ring over the inner ring, while the columns of the inner ring are carried on raking struts starting from the foot of the columns of the outer ring at the ground level. The third and fourth decks are similarly carried. It is needless to say that the effect is anything but pleasing.

Mr. T. Sington, of Manchester, sends a design "based upon an idea taken from the ruined tower of Atesh-Gâh at Firûzabad." The tower is 1,200 feet high, rising out of a square base of very large area. An inclined road runs round both base and tower.

We have not space to enter at length into the miscellaneous designs, and must content ourselves with very few examples. Mr. J. Horton, of Copley, near Halifax, sends a design for a tower 1,200 feet high and 180 feet in diameter at the bottom. It is built of corrugated plates, the corrugations running vertically, and, of course, getting smaller as the tower grows less in diameter. A curious effect is produced by a spiral way which runs round the tower, apparently carried on brackets. For half the height there is a spiral road for tramways and other vehicles. Under the motto of "Health, Light, Rest, Pleasure," is shown a building which would accommodate all the inhabitants of a large provincial town. An enormous circular tower rises out of a group of buildings beside which St. Paul's and the Crystal Palace would look small, and runs to a height of 1,300 feet. The tower marked "Ajax 4314390" looks like a magnified coast-guard station shored up by gigantic props. "Neloah" is a concrete tower of 1,200 feet, and is a handsome design. Next to it is a steel mast 1,200 feet high, which depends for its stability upon a multitude of wire-rope guys, anchored to concrete foundation blocks. The tower of Mr. Lamont Young, of Naples, is composed of a group of five towers, the main central tower, of 440 metres height, supporting a large terrestrial globe and four secondary ones.

We have only been able to give a very hurried and fragmentary account of the most striking of the sixty-eight accepted designs. The task of selection will be a very difficult one, for the public will insist that the new tower shall be an ornament to the metropolis, and not a blot, and it is difficult to reconcile this condition with the very ample space which we believe to be a necessary feature to insure success. We doubt if any of these designs will ever take concrete form; possibly by combining the best features of two or three, there might be produced a tower that would be both beautiful and a financial success.

ARCHITECTURAL SHADES AND SHADOWS.[1] — X.

CHAPTER VII — (*Continued.*)

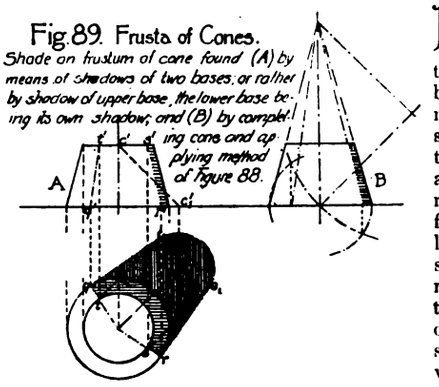
Fig. 89. Frusta of Cones.
Shade on frustum of cone found (A) by means of shadows of two bases, or rather by shadow of upper base, the lower base being its own shadow; and (B) by completing cone and applying method of figure 88.
A
B

111. IT often happens in a drawing that the shadow of the base of the cone does not appear, and that sometimes, indeed, the whole shadow of a spire or conical roof falls upon profile planes or irregular surfaces, and consequently can be of no service in finding the shade on the conical surface. In such cases the really very simple operation described above is particularly useful.[2] Having once obtained the lines of shade on the cone, to cast its shadow, whether on a plane or on an irregular surface, becomes simply the problem of casting the shadows of two right lines.

112 For oblique cones, and cones in other than principal positions, no special rules can be framed; the shadows of base and vertex connected by two tangents furnish in all cases a ready solution of each separate problem. The shadow of a frustum of a cone (a form which in architecture rarely occurs except in the guttæ of the Doric order) is found by casting the shadows of both its bases and connecting them by tangents (Figure 89, *A*). This method applies as well to frusta of pyramids, the extreme points of the two base-shadows being connected by right lines corresponding to the tangents used for the conical frustum. The lines of shade are then found as for the complete cone or pyramid. When only the shade is required, or the shadow of but one base, the line of shade on the frustum may be found by completing the cone and using the method of Figure 88, as shown in Figure 89, *B*.

113. The shades and shadows of surfaces of revolution in general are found by the general method outlined in Chapter III, and which will be more fully developed in a later chapter. But any surface of revolution may be considered as made up of an infinite number of frusta of cones whose various lines of shade and of shadow together form the line of shade and the line of shadow of the whole surface of revolution. Consequently if we complete the cone whose infinitesimal frustum forms any given zone of the surface of revolution (that is, the cone circumscribing that surface and tangent to it in a

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[1] By A. D. F. Hamlin, Assistant Professor of Architecture in the School of Mines, Columbia College. Continued from page 83, No. 750.

NOTE. — [In view of the inconvenience of having to refer to back-numbers for explanations of the notation used in these papers, the following memorandum will be found of service.]

HP = horizontal plane of projection; $V'P$ = vertical plane of projection; GL = ground-line or horizon. Capital letters designate points and lines in space, small italics their horizontal projections, and the same accented or "primed," their vertical projections. Subscript figures indicate points of shadow: small figures above the line indicate points of shade. Greek letters (α, β, γ, θ, δ,) designate angles. The *diagonal* of a line or dimension is its length multplied by $\sqrt{2}$. Shadows are indicated by vertical shading; shades by horizontal shading; shearing light by oblique shading parallel to the projections of the luminous ray.

[2] There is no simple formula for computing directly the distance from the foot of the axis of the cone to the foot of the rectilinear line of shade on either the nearer or further half of the cone for any given angle at the base. If this distance be called D for the visible line of shade on the upright cone and the invisible line of shade on the inverted cone, and the height or length of axis of the cone be designated as h, $D = \frac{\sqrt{2h^2 - 1} + 1}{2h}$ For the corresponding distance on the further or invisible side of the upright cone, and the nearer or visible side of the inverted cone, which we may designate as D', we have $D' = \frac{\sqrt{2h^2 - 1} - 1}{2h}$ These formulæ are too complicated for practical use, and the geometrical method of Rule (XIII) and Figures 87 and 88 still remains the most direct process for finding the position of the lines of shade on the cone.

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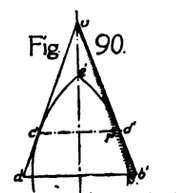
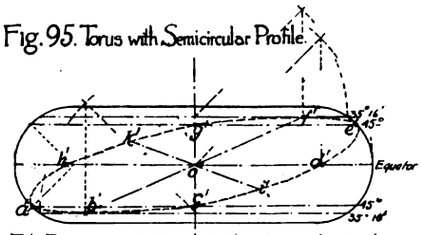
circle of revolution) and find its line of shade, the infinitesimal fraction of that line lying on the assumed frustum — or, in other words, the point where the line of shade of the cone crosses the circle of its contact with the surface of revolution — will be a point of the line of shade of that surface (Figure 90). By assuming as many of these frusta or circles of contact as we please, and locating the point of shade on each at its intersection with the line of shade of the tangent cone, we can ascertain so many points of the required line of shade of the whole surface. If we are familiar with the position of the line of shade on the cylinder, on the cone of 45° inclination and on the cone of 35° 15′, we can readily locate a point of the line of shade upon the circle of contact made by each of these cylinders or cones. And as most spindles, toruses, balusters and like forms will have two circles of contact for each kind of cone (namely, one with the upright and one with the inverted cone), and at least one with the circumscribing cylinder (namely, the circle of greatest convexity, which we will for convenience call the *equator*), we can generally determine five points of the line of shade at once. If we are also familiar with the general character of the line of shade of the surface we are investigating, we can sketch the required line through these points with a very considerable approximation to accuracy.



Spindle c̲d̲ e̲' is in contact with cone a̲'u̲'b̲' along circle c̲d̲'. The point f' where this circle cuts the line of shade v̲'s̲' of cone, is a point in line of shade of spindle.

114. Figure 91 shows a solid of revolution, composed of a cylinder and cones, or frusta of cones, with the line of shade belonging to each part. Figure 92 shows a spindle-shaped surface of revolution with five points of its line of shade located by means of the

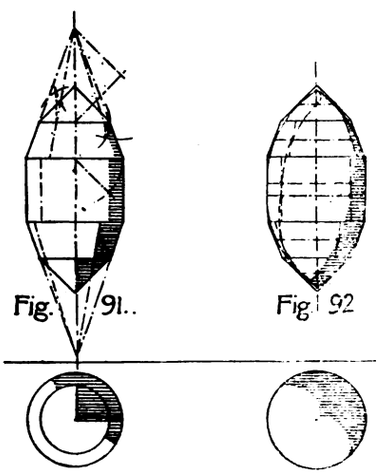


This Torus, generated by revolution of a semicircle, is symmetrical with respect not only to its equatorial plane, but also to its centre o'. When the visible half d̲b̲d̲e̲' of its line of shade has been found, the other half may be drawn thro' the points f'g'k'h', equidistant from o' respectively with b'c'i'd' upon lines drawn from the latter through o'. In other words, go' = ok'; ko' = oi'; ho' = oi'; and ho' = of'.

just-mentioned figures in Figure 91. Whenever the position of the line of shade on a cone is known, we need not draw the whole cone, but only a small part of its extreme right or left hand element tangent to the profile of the solid of revolution, in order to locate the circle of contact upon which the point of shade is then marked at the required distance to right or left of the axis. As the line of shade on the cylinder is upon its corner, that of the direct cone of 45° upon its extreme right-hand or profile element (Figure 84, *A*) and that of the inverted cone of the same inclination upon the middle front element (Figure 84, *B*) it remains only to determine the highest and lowest points of the line of shade, which are on the two circles of contact of the direct and inverted cones of 35° 15′, on the further right-hand corner of the former (consequently out of sight) and the left-hand front corner of the latter of these two circles, leaving all parts of the surface of revolution flatter than these two cones wholly in light or in shade according as they are directed towards or from the sun. We are thus enabled to formulate the following rule for determining five or more points of the line of shade of any torus, spindle or similar convex surface of revolution whose axis is a principal line. The rule applies to the projection on the plane to which the axis is parallel; from this projection the points, once found, can easily be located upon the other projection, in which the circles of contact appear as circles instead of parallel lines:

115 — (*XIV*) *a. To find the visible line of shade upon a convex surface of revolution, locate upon that one of its projections in which the axis is parallel to the plane of projection, the circles of contact of cones of* 45° *and of* 35° 15′ *inclination, both direct and inverted (by drawing to its lateral profile, tangents at the above inclinations) and of the cylinder (by a vertical tangent); drawing through the points of contact thus found the rectilinear projections of the circles of contact; these will be right lines perpendicular to the axis. Upon each of these locate the point where it is crossed by the known line of shade of the cone to which it belongs; these are points of the required line of shade.*

b. If additional points are required, find the apex and circle of contact of each of several cones; locate their several lines of shade by means of Rule (*XIII*), *and proceed as above. The line of shade of the solid of revolution will pass through all the points thus ascertained.*



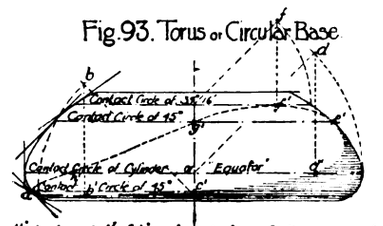
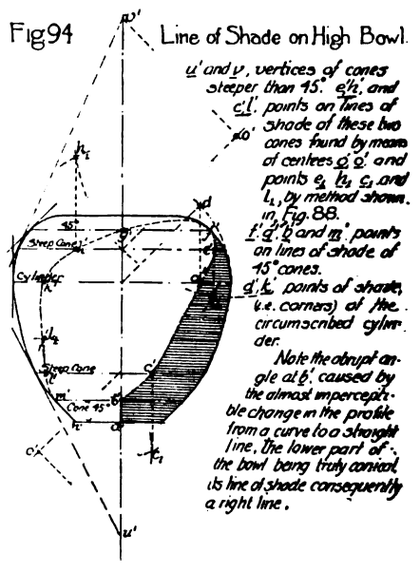


Fig. 93. Torus or Circular Base.
Contact Circle of 35° 16′
Contact Circle of 45°
Contact Circle of Cylinder
Equator
Contact Circle of 35° 16′

Highest point f' of line of shade is on further corner of circle of contact of upright cone of 35° 16′. Lowest point b' is on front left-hand corner of circle of contact of inverted cone of 35° 16′. e'g', points of line of shade of upright cone of 45°. d'c', points of line of shade of inverted cone of 45°. Line of shade of Torus crosses Equator at its corners d' and h'; it is tangent to profile of Torus at g' and a'. Points b, f, d, used in finding the corners of circles of contact, b', f' and d'.



u' and v', vertices of cones steeper than 45°. e'h', and c'l', points on lines of shade of these two cones found by means of centres o' o' and points e, l₂, c, and l₁, by method shown in Fig. 88. f'g', b and m', points on lines of shade of 45° cones. d'k', points of shade, (i.e. corners) of the circumscribed cylinder. Note the abrupt angle at b', caused by the almost imperceptible change in the profile from a curve to a straight line, the lower part of the bowl being truly conical, its line of shade consequently a right line.

The result of applying the first part of the above rule to the sphere, torus, spindle, etc., may be particularized thus:

(*XV*) — *The visible line of shade upon a torus*[1] *is one-half of an irregular curve, tangent to the right and left hand profiles of the projection of the solid, at their points of contact with tangents parallel to the projection of a ray of light. It crosses the equator at its front corner furthest from the sun; it crosses the middle-front element (or projection of the axis) at the point where this is intersected by the circle of contact of the inverted* 45° *cone; and is tangent to the circle of contact of the inverted cone of* 35° 15′ *at its front corner nearest the sun.*

116. This last rule, once fixed in mind, enables the draughtsman to find in a few seconds the five most important points of the visible line of shade upon any torus, spindle, vase or baluster having a convex profile, or even a profile of double curvature, where the concavity is very slight. Where the concavity is pronounced, as in broadly spreading bases, in circular scotias, and the like, the problem is complicated by the shadows cast upon part of the concave portion of the surface, by the convex portion, so that the "method of slicing" has to be resorted to. But for a considerable proportion of the various solids of revolution common in architecture, and for the convex portions, at least, of all others, it affords the most convenient and simple of all methods for drawing the line of shade with approximate accuracy, and Figures 93 to 96 illustrate its application.

117. When it is desired to complete the line of shade by drawing the further or invisible half, this may be done in the case of all spindles or toruses whose profiles are curves symmetrical with respect to the "equator," by drawing through the centre of the equator any number of right lines to points of the visible line of shade already drawn. These points are each, upon its line equidistant from the centre of the equator, with a corresponding point of the required further half of the line of shade. Consequently if we lay off on the further half of each of these lines a measure equal to the distance

[1] The spindle and sphere may be taken as extreme forms of the torus.

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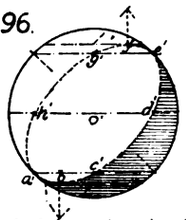
upon it from the centre to the visible line of shade, the further extremity of the segment so laid off will be a point of the required further or invisible half of the line of shade. This is made clear by Figure 95 where it is applied to a torus.

118. The sphere, which is one limiting form of the torus, is shown in Figure 96 where its line of shade is treated by the "five-point" method, the invisible half of the line of shade being ascertained by the process just indicated. Here the line of shade which in the torus is not a plane curve at all, and appears in the elevation as an irregular, ellipsoidal curve, becomes a true ellipse, as it ought to be, being the projection of a great circle of the sphere.

Fig. 96.



Line of shade on sphere found by means of five points a b c d e and three others equidistant from o with b c d, as in figure 95. It is of course a great circle of the sphere, and projected as an ellipse.

119. We have now given rules and methods for drawing the shades and shadows of all the principal geometrical solids most commonly occurring in architecture, except certain surfaces of revolution requiring recourse to the "method of slicing"; but the plane of incidence has in these discussions been assumed to be parallel or coincident with the plane of projection. It is our intention, to devote a part of the next chapter to the study of problems in which the surface of incidence is not a plane of projection, or, indeed, not a plane at all, and then to show the practical application of the "method of slicing," and of other methods for special cases. These will be succeeded by one or two chapters upon the general subject of the drawing and rendering of shades and shadows in architectural plans and elevations from the artistic point-of-view, and these will be the concluding papers of the series.

(To be continued.)

SILESIAN COUNTRY-SEATS.[1] — II.

IT was shown in the first of these papers on German country-seats that the manor-houses of Silesia are the most characteristic examples of middle aristocratic architecture in the Empire; that the total modernizing of seats undertakes the acquirement of well-lighted stairways for its chief object; and that the total neglect of modern improvements results in leaving a dearth of comfort, and that, even with considerable improvement, the average manor is unevenly and incompletely furnished. Kreisau, the country-seat of Count Moltke, was given as a fair specimen of the prevailing style of architecture, and some details, furthermore, were added as to the court of the typical manor.

A patch of "carpet" flower-beds, a round of grass, set off by hot-house trees in green tubs, or a quincunx of rose-trees, makes a space in this wide court for a carriage-road to wind round and distinguish its route to the front door; for though the rest of the expanse of the court-yard was once covered with sand, its yellow is now defiled, and the fresher and cleaner for the green and the flowers, looks the raked space that is immediately in front of the house. You print a footstep in it on alighting from your carriage to begin the ascent of the stoop, and a moment later you leave the coarse grains on the dark floor of the vestibule.

The vestibule is not this time a modern copy of the Italian Renaissance, but an old original, the like of which makes up the conception which one gathers of German country-houses in the main; it is the vestibule of the castle in which the German ambassador to Russia, Herr von Schweinitz, was born, and is now the property of Count H., a rich private gentleman.

The Vestibule.

Its shape is nearly square, and it lies in the bosom of the house, having the same width, and being found on the same line as the dining-hall, at the back. Between the two, or the dining-hall and the vestibule, lies a middle segment of hallway, where the stairs are to be seen. The glow of light visible in the illustration, falling on a rounded corner in the middle ground, comes through the window in the first landing of the staircase at the right. The vestibule is illuminated with double doors with side window-shafts, the panes of which are of stained-glass, in large geometrical forms, set in wood. The leads seen here and there in the tracery are not the remnants of the ancient framelets, but modern repairing; a replacing of a broken pane and its framelet costing much less — about half, and sometimes from twenty to a hundred times less — than a restoration in carved wood. (In the case of a charming scroll window-frame of a château I owned in Lower Silesia, the oak of which had become rotten through time and neglect, I was even unable to find an artisan to copy it at any price, so entirely has the art of wood-carving in *leisten* decayed at the present day. Windows were treated in some instances as mirror-walls are often found treated, in Venetian Gothic, or as illumined backgrounds for fantastical tracery. Leads, and all that we attach to English windows of the Middle Ages, play no *rôle* in Silesian manors.)

The floor of the vestibule is composed of the broad planks without jointures that the early squire was fond of having laid in a conspicuous place, as proofs of the great antiquity of his forests, for width meant age. The covering of it is only partial, and of a date so recent as the invention of linoleum. The old-fashioned old manor has a bare vestibule floor, partly, I think, because of the ruinous dirtiness that results from the custom of covering all paths of the park with loose sea-sand, and from the visits to the stables which are made daily by the conscientious *hausfrau*, and are often undertaken out of politeness and curiosity by guests. This and similar customs, such as the gathering of the peasantry in this part of the castle at Christmas and other dates, has been against the laying of hall floors with anything less easily cleaned than mats. Where the floor is not of painted or scoured wood, it is composed of slabs of limestone.

The essential furniture of a *vorhaus* is a bench. The peasant who comes with a complaint, the *knecht* arriving with a message, the lackey who brings an invitation — all must wait, and wait here in the vestibule. My illustration does not show the seat under the fur mantle that hangs at the left, but, if it were distinguishable, it would be seen to be of carved oak, with a back-board three feet high, and inscribed with the arms and initials of the proprietor.

The second essential piece is the stove, and I am glad to be able to show this example, although it did not stand in its present corner originally, but was brought down from one of the state chambers now out of use. It is exceptionally delicate for a hall stove, its costliness aside, however, and it serves uncommonly well for showing a favorite style of this masterpiece of German furnishing.

The material is glazed pottery, with feet of cast-bronze, set upon a floor of tiles. The ground tone is white, and the plaques are cast in different shapes and sizes, some, like that of the middle pieces, representing a grotto-niche, being of unusual length and width. Each plaque is modelled with charming elaborateness of finish, after light and lively designs. The painting is less successful. The tones, however, run in the same *baroque* and gay inconsequentiality as the spirit of the modelled genii over all the scale of colors; or in reds, greens, blues and yellows. The top mounts like a double roof, and is crowned by a brown and green fowl of indeterminate genus, but most excellent hard glaze. The effect of the whole is light and refined, and the stove has only to be thought of as standing in a lofty, square chamber with white and blue furniture, as it originally stood, to be found in exquisite taste.

In the corner, against the wall, is a pipe-like opening that penetrates the wall and empties into the middle corridor adjoining. Here the stove is lighted. Now, whether this arrangement is common to all German stoves of past date I cannot say; I forgot to note this particular in the specimens that are set up in the Berlin, Munich and Nuremburg museums. But of Silesian stoves, I found a quantity which not only opened into a corridor, but that, in some cases, three stoves are lighted from a single corridor-closet. Often, indeed, the closet is an architectural structure, built out of brick, like a huge wardrobe, covered with stucco designs and closed by wooden doors (painted in colors), or by brazen open-worked leaves, the space inside being large enough for a supply of wood and for a man-servant to turn about in.

[1] Continued from No. 749, page 70.

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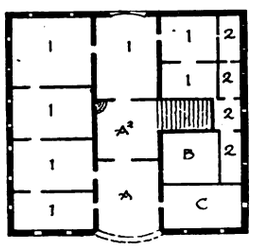
The other decorations of the vestibule are the usual hunting trophies. A tall clock in a rococo case is adorned with bronze tracery designs. The door-frames are of the simplest order. The two leaves of the door have a handle and lock shield of massive brass. A low, vaulted doorway in the cavernous depth of the wall at the right is filled by an oaken, unpolished door, with hinge and lock works of wrought-iron, spread ornamentally over half the surface of the oak, and leads into a vaulted storeroom. Another door opens into the porter's or lackey's chamber.

At the left, one enters the suite of society rooms that occupy the outside of nearly three out of the four sides of the manor. Of the two rooms that are entered directly from the vestibule, that in the corner is the cabinet of his honor, and is used as a smoking-room on social occasions.



Ground Floor of the Manor.

A¹, Vestibule; A², Middle hall and stairway; B, Store-room; C, Lackey's and porter's room; 1, Society rooms; 2, Vaulted chambers.

No better example could be found, perhaps, of a rich old interior, in which the inclination to snugness, which counts generally as a plebeian or *burgerliche* trait, has been given the place, for once, of formal, sharply-defined scantiness. The ceiling is composed of an oblong, octagon, central field, surrounded by smaller fields of lime-wood, with a foot-deep framing of hard oak; the planes elaborately inlaid with intarsial designs of the heavy, heraldic patterns *à la* Scheffersteïn. The window light, striking them irregularly, reveals here a fantastic claw, there a round limb, a puffed cheek, a grinning mask, or the delicate throat of a forest flower, and I, for one, reclining back in the niche below, have more than once beheld strange embodiments of the mediæval German world. Or was it just the imagination of a mind removed from the activity of the town and set amidst these isolated landscapes, with their woods and morasses and sombre climate, that evoked such a fantastic population? Just as these outlines of dragons flash out for a moment when hit by a ray of light, so must the monster of the chivalrous tale of St. George, and all the beings of the ballads of the wandering *spielmänner*, have come like illuminations into the monotonous, dreary humdrum of these early countrymen's lives. Indeed, mediæval poetry is full of instances where the horsemen and their glistening armor, moving along a distant road, appear as visions of supernatural beings to the observers on the castle towers. They were not an abstract and artistic, but a most familiar folk — these genii and dragons to the warriors and châtelaines of the Middle Ages and their vassal artisans.

Wherever their outlines occur in art works, they possess, in consequence, a nice finish and detail. A massive oaken wardrobe of lofty height, an oaken table and a niche in the thickness of the wall, lined with oak and ending below in a semi-circular carved bench, have ornamental cornices with grotesques for subjects, all of which are models of life and action. On the shelves above the bench, however, stand some German mugs of the seventeenth and eighteenth centuries, and the paintings on these are proofs of the helplessness of workmen before unfamiliar tasks. They are scenes of French idyllic gallantry, and lack every detail of form. There are *objects* enough. You get even bed-screens set up in the open air against draughts. But the attitudes of the gallants and their ladies are like childish caricatures, whereas, for these scenes, the *air* of personages should compose the essential trait. One laughs at the clumsy imitation of foreign patterns, without wondering why similar arts should show such different degrees of excellence, as the marquetry of the ceiling and the designing on the mugs. In one case the objects of the drawing were traditional and intimate, while in the other they were vague and unfamiliar.

As for the cushions and hangings of the bench, they are, of course, modern, but care was used in choosing them to match the style of the ceiling and furniture. Very heavy curtains hang before the windows and the space between them. Indeed, a large portion of wall is covered by this hand-woven drapery of dyed wool and gold thread. It has no compositions for designs, but only separate figures of dragons and heraldic flowers, so that nothing is lost by its being suspended in folds. As is the case with the back hangings of the niche, the suspension of the drapery is by means of brazen rings and grotesque hooks.

The chairs, like the rest of the furniture, are of carved oak. Their covering of pressed leather is also modern; so, too, are the thick Oriental carpets that cover the parquette floor, as, indeed, all stuffs must be to convey the warm and subdued impression of cleanliness and freshness. The faded tapestries which are occasionally seen in old manors are relegated to galleries; they are adverse to the housewifely sense of the provincial châtelaine.

Her own personal salon in this instance is typical in as far as it is wholly without style. One is commonly struck in houses of the middle aristocracy and the gentry of the old and stable order, by the sight of very costly original and restored gentlemen's rooms and of incoherent ladies' salons. These two apartments occur in every manor and retain their functions from one generation to another, the chief point in determining the situation of the first mentioned being a nearness to the front-door of the court-side of the house. And this being settled, it follows naturally perhaps, that the wife's sitting-room is made the adjoining one: while the prevailing inferiority of the last is easily accounted for by the national sense of the second-rate position of woman — a sense that is conventionally raised to an unspoken dogma of the propriety of the husband wearing on his person and showing in his surrounding the greater stateliness.

As a rule such a lady's salon is an epitome of successive replacements, rather than of restorations. That which remains of earlier times are the substantial architectural details of ceiling, wall and windows, or such massive pieces as the stove. The furniture, which was not massive, has been replaced by bits of equal inferiority, such as tables of limewood instead of durable oak; and, furthermore, mostly in slenderer forms, as more suitable to the feminine sex. The instances are rare where a complete lady's cabinet has withstood the accidents of use and time, and is original; even although it is just this apartment of the manor which is the least ancient.

Your old German house had no especial place for the *hausfrau*. The thing was an adoption from France and Italy. All the mediæval German woman had set apart for her use was a corner of a room.

This historic fact I have often found very interesting, for in manors, which are the strongholds of so many conservatisms, the prevailing French style is still noticeable to-day in the architectural details of ladies' salons.

The salon of Countess H. has a white stucco ceiling, with a plain expanse, delicately bordered by gilded lists. The walls are divided into fields and framed by the same style of lists. And this elegant light decoration is repeated in the doors, bay-shafts and head-mouldings, as well as on the interior shutters of the windows. The stove is composed of white, plain tiles, with a figure moulding in front, of medallion shape, and is surmounted by a cornice-like heading.

In this airy setting one piece of furniture remains of early date, a lofty mirror. Its tall side pilasters are completely covered with graceful patterns and support a chastely-cut, arched head-piece. A cornice below sets its feet firmly on the floor, and curves upward with a temperate swing of line to the polished slab of white marble that serves as the mirror's shelf. The whole has the architectural effect which characterized mirrors of the eighteenth century in France, in contrast to our modern tendency to treat the piece as a picture or movable ornament, and to old German traditions as well as to modern German usages. An account of this effect, as well as to the rich gold and white of the coloring, the mirror conveys the impression of belonging to the architecture of the room. The remaining pieces wear the common air of being set into the room, nor do I mention them, as I hope it is understood, because of any peculiarity except their mere existence there.

A *chaise longue* stands with its head against the wall and its foot towards the centre of the room, and is a short, square frame of pine-wood, stained to imitate walnut, and covered by a parti-colored cover of plush. It is wholly without arm-rests. This latter feature, that has counted so long in history as the symbol of rich ease, is, indeed, reduced to the last insignificance in all the furniture of the room. The sofa has low rolls for arms, and the fauteuils about the table in front of it, possess mere excrescences, in the joining of the semicircular-shaped back to the seat, as representatives of their members.

Of the other pieces that make up the inventory of ladies' salons, the writing-table, of solid rosewood, is broad, low and railless. The chair before it, of ebony, elaborately decorated with enamel painting in pearl and agate tones, has the round back-form of modern high-seat fauteuils; but, whereas fauteuils are cushioned and upholstered, this fancy chair consists entirely of framework. One corner *étagière* is rococo (one-legged waved-table of hardwood, decorated with bronze ornaments): another, modern (mahogany, with delicately-turned columns of the same wood). A low chest, meant to receive family chronicles of minor importance, such as the school examinations, money accounts of the children and so forth, stands against the wall near the *chaise longue*, and is of stained limewood and decorated with intarsial painting. A couple of small, round-top stands are hung with hand-embroidered covers. No piece of furniture besides the mirror is lofty in height save a slender wardrobe, with sides and front of solid rosewood. A number of portraits and paintings, in gilt frames, hang on all the walls; and curtains of modern, woollen cross-striped stuff are at the windows, while the stove screen is a curtain of the same material, but ornamented with the arms of the family in gold embroidery, and suspended from a rail, fixed at one end into the wall, at the same height as the top cornice of the stove.

The room adjoining retains an early ceiling of stucco, while the walls are clad with wood. The panelling shows the manifold waving lines of the rococo style, is flat rather than deep, and the structure of the fields is marked by round-faced lists, painted white. The ground-tone of the wood is a light, clear brown. Brown-colored oak (book) cases, of shoulder height, with small, round, stained leads, in chastely-carved frames for doors, occupy the whole space of the three inner sides of the room except the corners.

In one of these the panelling of the wall is seen, and here it composes a door that opens into a small, round staircase, with a spiral flight of steps. A second corner glistens from the stately constructions of a brown majolica stove, with ridged plaques and elaborate front-reliefs and head-piece.

Bronze small copies of Classic sculpture and a few prints in oaken frames, compose the only ornaments of this apartment, which

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has a quadrangular heavy table and a few rococo chairs for its sole furniture.

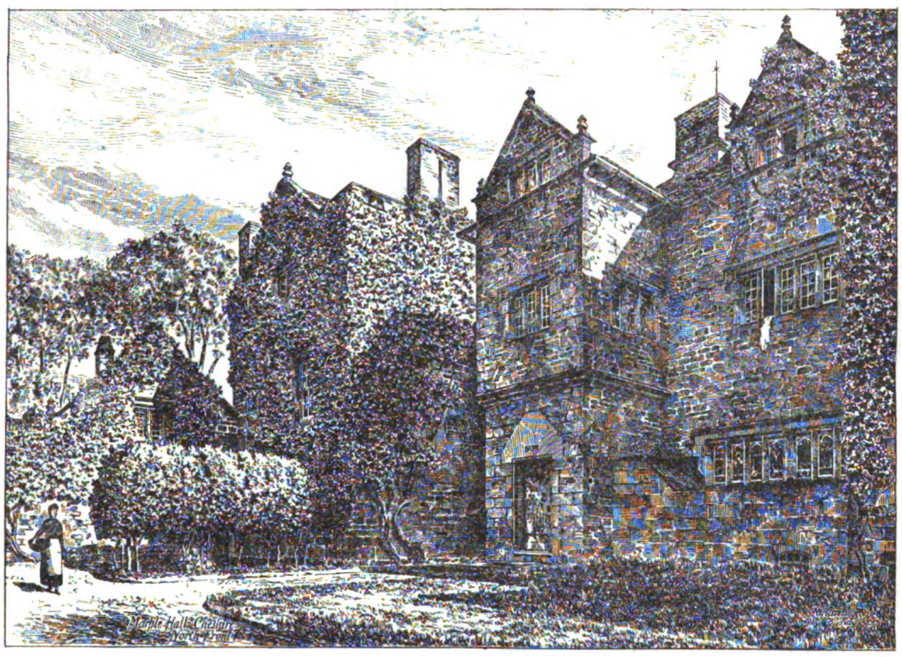
The room is an ante-chamber to the salon. Now it occurs frequently that German salons are two-stories, or one and one-half in height. We shall see later that this rule is almost invariable in castles of the higher aristocracy — or, let us say the richer, aristocracy. But so long as the one-story type is as common in manors as the two-story *saal*, I keep on describing the seat which I have selected.

Its *saal* is simple, but a gem of its kind for a provincial house, meant to receive a high-bred, stiff and conservative company. Other rooms are made for enjoying ease, intimate conversation, the sensuous indulgence of eating and the cloistered quiet of reading or meditative moods. One room must be devoted to the restrained, first presentation and intercourse of carefully-nurtered youth.

So we find a spacious apartment that is almost empty. The ceiling of white stucco has a broken, waving line of high-relief for a border and a similar pattern, both in blue, for a frieze.

The walls are composed of Dutch tiles, which are white, with small landscape designs in blue. Doors and windows, and the frames of the mirrors that are built into the spaces between the niches of the latter, are decorated with the same graceful form of reliefs in blue, which occur in the frieze. A white porcelain stove of massive dimensions has a fireplace below, and candelabra of Dresden china for shelf ornaments. Three corners of the room are filled out by sofas, so constructed as to end in a lofty, corner headpiece in the shape of a cornice, and support porcelain vases. The only other furniture of the room is a round centre sofa, that is removable, and spindle-legged tables; a forty-armed central candelabrum of gilded bronze, and three-armed wall candelabra; and, at either side of the door-frame, on the dining-room side, a buhl pilaster, surmounted by immense Sèvres vases, of rose-color and gold, with medallion paintings of idyllic landscapes. The covering of the sofas is blue and white cretonne, while the window curtains are of white native laces.

The aspect of the room is cool and refined to a very high degree, and when the lights are aflame a flush of gold is reflected like a shimmer from the polished wall. I have yet to see a room where the rosy countenances, shoulders and gauzy toilettes of girls have a more magical background. The glow of the wax lights adds the necessary heightening effect of animation to the cold tones of the white and blue walls; and their hard glitter is the best contrast possible to the exquisite, light-absorbing quality of the human skin.



Marple Hall, Cheshire, Eng.

A ball-room is a display ground of personal charms, and it must be considered a most happy hit, where the architecture of it takes up these charms, like a setting its gem, and leaves them in their due and rare conspicuousness. And how very successful the present room is, must come to light, when it is remembered that the charms which it displays are those of unsophisticated maidens; for dancing is restricted in great part among the Silesian aristocracy to unmarried women, and, furthermore, to the formal numbers of the quadrille. A tone of sensuousness, given by plastic details, or choice of coloring, or of stuffs, and in accordance with the spirit of festivals, is quite admissible in ball-rooms which are resorted to by mixed or by sophisticated companies.

Such a tone, indeed, is almost imperative in public or club-house salons. But where the first social intercourse of young couples is to take place among traditionally suave and stately surroundings, a pattern could be taken from this Silesian *saal*.

The coloring, blue and white, is very common in old German society-rooms, and so, too, is a rococo-like style of architecture. That which distinguishes my specimen *saal* are the walls. Their material is glazed earthenware, be it noted, in place of stucco.

COUNTESS V. KROCKOW.

[To be continued.]

PARIS

THE TWO SALONS OF 1890. I. — THE SALON OF THE CHAMPS-ELYSÉES.

THE *Salon* of the Champs-Elysées is the first to open its doors, on the usual date, and in the accustomed place, in the Palais de l'Industrie. The other, that of the Champ-de-Mars, has fixed the date of its inauguration on the 15th of May. Let us recall in a few words the discussions which have resulted in this unfortunate schism among the members of the Society of Artists. The storm first broke out in connection with the recompenses awarded at the Exposition. At the meeting of the general assembly of the Society, in December, 1889, over which M. Bouguereau presided, the committee asked the assembly to decide whether the recompenses awarded in the Exposition should be valid for the annual exhibitions; that is, whether they should confer the dignity of "Hors Concours," or "exempt." This question was one of some importance, as the number of new artists who would become endowed with the title of "exempt," as a result of awards at the Exposition, would be 645, in addition to the 1,856 already existing. In painting alone the number of exempts would in this way amount to 1,422, and many artists feared that the space properly due to those not yet honored by an award would be found extremely limited. Very violent discussions followed. M. Meissonier tried to show that the new exemptions would be less alarming than was asserted, and appealed to the patriotism of his colleagues, saying that France ought not to try to diminish the value of recompenses which foreigners had received with gratitude. M. Gérôme observed that the Exposition was organized by the Government, while the annual *Salon* was conducted by a Society, which ought, above all, to keep the control of its own exhibitions. Finally, after a worse than stormy session, in which anything like discussion was impossible, a formal vote was ordered. By 405 votes against 82, the Society decided that the recompenses of the Exhibition should not carry with them the title of "exempt" for those who received them. By the same vote, also, all exemption was abolished; and every canvas was required to be submitted to the jury of admission before it could be received into the *Salon* of this year. With this, however, the Society protested against the idea which some attributed to it, of wishing by its resolutions to depreciate the Exposition, and cast doubt on the competence or fairness of its jury; and repeated earnestly its sentiments of brotherly friendship toward foreign artists, who had always been admitted to its exhibitions on a footing of perfect equality with Frenchmen. Finally, the committee decided that the recompenses of the Exposition should be duly mentioned in the *Salon* catalogues.

But before the vote which rejected their views, several members of the committee ranged themselves beside M. Meissonier, and offered their resignations. These were MM. Puvis de Chavannes, Carolus Duran, Dagnan-Bouveret, Duez, Gervex, Roll and Waltner. These artists, followed by several others, then organized a private *Salon*, which is to open May 15 in the rooms of the Palace of Fine-Arts in the Champ-de-Mars. It is thus that the names of several successful artists are wanting in the *Salon* of the Champs-Elysées; let us hasten to add, however, that some of these artists already begin to regret their rash step; and that it is probable that next year all will be found again under the same banner, and under the same roof, in the Palais de l'Industrie.

The opening of the *Salon* of the Champs-Elysées, called also the

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Salon-Bouguereau, was thus awaited with an impatience even more lively than usual. The jury was rumored to have been very severe; but in any case the schism among the artists would be likely to cause a difference in the number of pictures sent. In point of fact, the number of canvases shown this year is 2,480, against 2,771 last year, and 2,786 in 1888. The difference in number is, therefore, not very sensible. Let us examine now the quality. Well, it is about the same as usual; the same first impression, after a rapid glance, of mediocrity. However, on a more critical examination the first impression is somewhat modified; one recognizes much talent everywhere; talent, also, the more conspicuous, since we have no longer to occupy ourselves with a certain number of fashionable artists, who shed upon the *Salon* the brilliancy of their names, or of their works, a brilliancy greatly heightened by the powerful aid of the newspapers. Many are absent, but many remain, to attest the strength and influence of the modern French School, which carries everything before it, particularly in the departments of landscape and portraiture. These two departments are very fully represented this year, and in a brilliant manner, while decorative paintings are hardly anywhere to be seen, the conspicuous exception being a work of M. Munkacsy, who, after several years of absence, exposes an immense canvas, composed for the decoration of a ceiling in the Museum of the History of Art in Vienna. It presents an allegory of the Italian Renaissance. In the middle of a decorative architectural background, a sort of rotunda, open to the sky, the middle of which is occupied by a projecting loggia, are grouped the principal artists of that great epoch, Raffaelle, Leonardo da Vinci, Paul Veronese, Michael Angelo, and so on. The loggia is occupied by Lorenzo the Magnificent, the great protector of the arts. Several figures of women, naked, standing as models to the pupils of Titian, bring into the great decoration the bright note of their flesh tints, and the graceful lines of their figures. M. Munkacsy has painted his own portrait at the right of the picture, as if to show that he is found worthy of a place among these immortal artists. Finally, hovering over the whole, the figure of Glory, indispensable in such compositions, holds in her hand a huge palm; while Renown, who accompanies her, blows her accustomed tune through the familiar old trumpet. All this is well grouped, and in a grand style, but how can one judge of such a work, which is not placed, either in distance or position, or in lighting or surroundings, as it is intended to be? The distortion of ceiling perspectives when placed in vertical planes is inconceivable; and one is equally disturbed by the enormous size of the figures, which are to be placed, it is said, at a height of forty feet from the floor. However this may be, we can suppose that the ceiling will have a grand effect in the Vienna Museum.

M. Munkacsy has also sent a portrait of Mme. B. Princess S. Here, as in his ceiling, M. Munkacsy adopts a bright and luminous manner, of an exquisite charm. It is one of the prettiest things in the *Salon*. The Princess S. is seated in the middle of a quantity of artistic bric-à-brac, which serves as an elegant frame, and indicates aristocratic surroundings, without injuring the effect of the principal figure, or leading the attention away from it. The whole is in perfect harmony, and has a rare quality of distinction. M. Jean-Paul Laurens, on the contrary, has this year, notwithstanding his talent, a portrait of a woman which is thoroughly displeasing. Standing erect, in a room which, by the perspective, ought to be of considerable depth, the figure appears, nevertheless, glued to the tapestry of the further wall; and the whole is flat and devoid of relief. Passing rapidly in review the principal portraits of the *Salon*, we should mention that of M. Carnot, President of the Republic, whom M. Bonnat has made very harsh-looking. This artist appears to be changing his former firmness into dryness; among the broad, vigorous touches which characterize his energetic talent, he has come to put little hatchings, which look like so many furrows in the flesh portions, or little shavings in the hair. And if this way of working is unpleasant in his portraits of men, it is still more so in the portraits of women, in spite of the evident effort of the artist to soften its force.

M. Henner is always an idealist, even when he paints a portrait. All his subjects acquire, thanks to his brush, that look of ivory seen by moonlight which the artist gives to his flesh-tints; and it is thus that appears to us, in an imperfect resemblance, Madame Roger-Mielos, the great pianist.

A pupil of M. Bonnat, M. Louis Galliac, shows a beautiful portrait of a man; and M. Korochanski, a Russian artist, shows a splendid portrait of a woman.

Among the most remarkable portrait-painters, who sustain with honor the glory of our French School, we will mention further MM. Debat-Ponsan, J. Benner, Yvon, whose talent is always correct and conscientious; Weerts, who shows a charming little portrait of the sculptor Hugues, in his studio, skilfully treated in tones of white, of a delightful harmony, giving much relief and life to the figure of the artist; MM. André Brouillet, Ed. Fournier, Comerre, Chartran, whose portrait of M. Emile Blavet of the *Figaro* is a little too shining; Wenckler, Popelin, Machard, and Morot continue worthily this list of artists of talent, to whom should be joined Mlles. Singer, Besson and Beaury-Saurel, who has sent two canvases, strongly painted, which a master might sign.

Among the foreigners, M. Van Beers is always noted for his delicate painting, approaching miniature; and we will mention a very curious portrait by M. Van Hove, treated in the Dutch manner. Are those portraits, the figures of young women which Mr. Stewart, an American artist, has grouped in a picture entitled "Spring Flowers"? In any case it is pretty and graceful. The movements of the young girls disposing flowers on a table are graceful and natural, and if the background were not, unfortunately, a little too dry and detailed, it would be perfect.

M. Jules Lefebvre, besides a beautiful portrait, shows a large canvas, in a style outside of his usual manner, devoted to a subject which he has taken from an English legend. Lady Godiva, the most modest of women, was the spouse of the Count of Coventry. She interceded with him to remit the taxes with which he oppressed the people of his county. "Before God," cried the stern warrior, "I will not remit one of the taxes, unless you will ride on horseback, naked as a new-born infant, from one end of the city to the other." He thought thus to propose an impossible condition; but Lady Godiva accepted it, to save the poor people. Her husband then ordered that on the day of the trial no one should set foot in the streets, and that all should remain in their houses, with doors and windows closed; and threatened with death whoever should cast a look upon his wife. And indeed, in a deserted street, we see Lady Godiva advancing, naked, on a horse led by an old woman. She has her hands crossed on her breast in a shrinking and modest attitude. The principal group, brightly lighted, is delicately treated, but the architecture, in a sombre and monotonous tone, is rather dry; the subject, moreover, does not suit a scale so large, and would undoubtedly have gained by not being presented at life-size.

[To be continued.]

BAYNARD'S CASTLE.

"All the Modern Improvements." — No. 12.

BAYNARD'S Castle, says Peter Cunningham, stood on the banks of the Thames, immediately below St. Paul's, and was so called of Baynard, a nobleman that came in with William the Conqueror. This fortress was fortified by him, or one of his descendants, in the year 1111, and granted to Robert Fitzgerald, son of Gilbert, Earl of Clare, in whose family it remained for three centuries. The Castle, however, is of Roman foundation, as can now be proved from two large stone corbels and other Roman relics recently discovered there in the erection of Messrs. Pilkington's new warehouse, now in course of completion.

These relics were exhibited and described by Mr. J. H. Macmichael at the recent meeting of the British Archæological Association. Mr. Macmichael said that in the course of the late excavations of this warehouse for Messrs. Pilkington, glass-factors, of St. Helen's, Lancashire (Messrs. Chambers, architects), many interesting relics had been unearthed, which, one may trust, will never be dispersed, but may eventually find their way to the Guildhall Museum. "If you thrive well, bring them to Baynard's Castle," says Gloucester to Buckingham, in allusion to that wily nobleman's efforts to engage the sympathy of the citizens. Other monarchs were entertained here down to Charles II, who is described by Pepys in his "*Diary*" as going, accompanied by "my Lord Sandwich, to supper at Baynard's Castle," June 19, 1660. The Earls of Shrewsbury resided here till the Great Fire, which, six years afterwards (1666), left only the blackened walls, never to be rebuilt. It had been twice burned and twice rebuilt. In 1428 it was almost entirely destroyed by fire, and rebuilt by the good Duke Humphrey of Gloucester. Henry VII again repaired or rebuilt it, and changed its form, says Pennant, "into that of a palace for quiet times." It is to the structure, as rebuilt by Henry VII, that the few architectural remains, such as the transom of a double or two-light window, and the two stone corbels, to be shortly hereafter referred to, appertain. The Roman wall along the whole south side of London proper terminated in Roman times, both east and west, with a fortress, which was called Arx Palatina, or the Imperial (Palatine) fortress: upon the site of these fortresses the Tower and Baynard's Castle were built, the limits of the city having been, in 1274, extended to Blackfriars. In the course of erecting the new warehouses for Messrs. Pilkington, some oaken piles were encountered by pick and shovel. These are probably identical in age with the "strong oaken piles" which Mr. Roach Smith tells us were used for the foundations of the Roman wall. Besides the transom of a window and the two stone corbels, one of the objects which have been lately dug up is an old steelyard. There is only one perfect example of the Anglo-Roman steelyard in the British Museum, and that is but 6 inches in length. Mr. Sutton,

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the Clerk-of-the-Works, who is himself a Devonshire man, and to whom is owing the preservation of this and the other relics, at the happy instigation of Messrs. Pilkington, says there is a steelyard of similar construction in use at the present day in his county. He does not, however, remember having seen anything like the incised ornamentation. The stone transom contradicts all the old engravings in which the windows are represented as single lights, this transom being that of a double or two-light window, as described by Pennant. But the two carved stone corbels are probably the most important discoveries yet made. They are both in low relief; one represents a pair of wrestlers, and the other a ram. The ram is not heraldic; it can, therefore, only represent the prize which the Mediæval or Roman wrestler received — either a ram or a cock — as a reward for his dexterity when victor. But the circumstance of the conjunction of two corbels measuring 1 foot 6 inches in height each, both carved in low relief, one representing two nude wrestlers and the other a ram, and both found built into a wall 16 feet below Upper Thames Street, is surely worthy of adequate attention. Not the least interesting feature of the excavations was the meeting with a black, manure-like stratum of substance about 2 feet in thickness, and 17 feet below the surface. What could this have been but the green rushes which were strewn upon the floor in the Middle Ages? Hence our word straw from *sterno*, stratum, to stretch out, straw being used in winter, as well as rushes in summer, to spread upon the floor — when they were said to have engendered a delightful sensation of coolness, as well as presenting a very pleasing appearance, recalling, as it did, the "simple manners of other times." There has been no necessity to strew the church floors, said Mr. Macmichael, with rushes in summer or straw in winter, since they were paved or flagged, as was generally the case after the Tudor period, and unusually so since the Reformation. "Is there a village church," he asked, "in the United Kingdom and Ireland where the bare floor still exists?" Grasmere Church is said to have had a bare floor in 1828. One, at least, of the numerous tiles or fragments which have been preserved dates from the original building of the Castle by "one Baynard" — that with two birds back to back. There is a similar one in the Geological Museum. Two fragments of skulls were also found 6 feet below the foundations, and 24 feet beneath the level of Thames Street, and, *mirabile dictu*, beneath an oak-tree, which was found *in situ!* A marbled tile (like scagliola of to-day), an ornamental metal hoop and boat-hook were all found together; also four spurs, a Roman nail, bone stilus, a primitive peg-top, a fragment of a short pendant, ear-pick, and a shoe, Norman or Plantagenet, with pointed toe; the peak was stuffed with tow or hay. Mr. Macmichael also exhibited some other objects of interest which had been found elsewhere, and which he described. — *The Builder.*

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

BUILDING OF THE BOSTON STORAGE WAREHOUSE, BOSTON, MASS. MESSRS. CHAMBERLIN & WHIDDEN, ARCHITECTS, BOSTON, MASS.

[Gelatine Print issued only with the International and Imperial Editions.]

COMPETITIVE DESIGN FOR THE ERIE COUNTY BANK, BUFFALO, N. Y. MESSRS. CARY & TROWBRIDGE, ARCHITECTS, BUFFALO, N. Y.

[Premiated Design. Issued only with the International and Imperial Editions.]

COMPETITIVE DESIGN FOR THE ERIE COUNTY BANK, BUFFALO, N. Y. MESSRS. M. E. BEEBE & SON, ARCHITECTS, BUFFALO, N. Y.

[Premiated Design. Issued only with the International and Imperial Editions.]

COMPETITIVE DESIGN FOR THE ERIE COUNTY BANK, BUFFALO, N. Y. MESSRS. CYRUS K. PORTER & SON, ARCHITECTS, BUFFALO, N. Y.

[Premiated Design. Issued only with the International and Imperial Editions.]

MEMORIAL VAULT FOR THE LATE HON. JAMES N. BURNES, ST. JOSEPH, MO. MESSRS. ECKEL & MANN, ARCHITECTS, ST. JOSEPH, MO.

SUMMER HOUSE FOR H. MCMILLAN, ESQ., GROSSE POINTE, MICH. MESSRS. MASON & RICE, ARCHITECTS, DETROIT, MICH.

SKETCH OF WINDMILL FOR L. A. EMERY, ESQ., ELLSWORTH, ME. MESSRS. STEVENS & COBB, ARCHITECTS, PORTLAND, ME.

STUDY OF RESIDENCES AND APARTMENT-HOUSE FOR W. H. DOUGHTY, ESQ., TROY, N. Y. MR. H. LANGFORD WARREN, ARCHITECT, BOSTON, MASS.

HOUSES FOR EDW. R. WOOD, ESQ., 17th STREET NEAR LOCUST, PHILADELPHIA, PA. MR. FRANK MILES DAY, ARCHITECT, PHILADELPHIA, PA.

SKETCH FOR BAPTISTERY, CHURCH OF ST. PAUL THE APOSTLE, NEW YORK, N. Y. MESSRS. HEINS & LA FARGE, ARCHITECTS, NEW YORK, N. Y.

[Additional Illustrations in the International Edition.]

WROUGHT-IRON GATEWAY. EXECUTED BY M. LÉON BAUDRIT, PARIS, FRANCE.

[Copper-plate Etching.]

THIS gateway, designed and executed in the studio of M. Léon Baudrit, is in the pure Louis XV style, and is remarkable both as a specimen of forging and for the handwork upon it. The centre panel is forged in a single piece, and surrounded with a light border decorated with delicate and graceful sprays of foliage. All this foliage in hammered-iron relief is executed with the hand of a master. An arched moulding supporting a lantern, completes and surmounts the work. A remarkable variety of execution distinguishes this work, in which the finish of the foliage is in turn relieved, flattened, forged, or hammered in the German style. In this connection we wish to add some details concerning the plate published in our number for May 10, 1890, representing the very remarkable wrought-iron balustrade executed by M. Baudrit for the Hotel of Prince Demidoff, Paris. In this work all the scrolls which are forged in iron, ornamented with mouldings raised in the forge, and finished with the chisel by cutting in the solid piece, terminate in enlarged projecting clusters. The foliage and the flowers are in hammered relief and intertwine gracefully their strong supporting limbs. The whole structure springs from a griffin, also in hammered iron, a veritable marvel of hammer and chisel, planted threateningly in the midst of his encircling foliage.

HOUSE ON THE REICHSRATH-PLATZ, VIENNA, AUSTRIA. HERREN KLAUS & GROSS, ARCHITECTS.

[Gelatine Print.]

THE CHURCH OF SAN FRANCISCO, LIMA, PERU.

[Grano-chrome.]

ARRAS TAPESTRY FOR EXETER COLLEGE, OXFORD, ENG. DESIGNED BY MR. E. BURNE-JONES, A. R. A., MADE BY MESSRS. MORRIS & CO.

FONT AND CANOPY, BENTHAM CHURCH, YORKSHIRE, ENG. MR. W. R. LETHABY, ARCHITECT.

RESIDENTIAL SHOP PREMISES, DIGBETH, BIRMINGHAM, ENG. MESSRS. ESSEX & NICOL, ARCHITECTS, BIRMINGHAM, ENG.

WE illustrate this week a group of shop and dwelling-house premises erected in High Street, Digbeth, the oldest part of Birmingham, on a portion of the Horton estate. They are picturesquely treated, and harmonize with the surroundings. The elevations are carried out with red bricks and Bath stone.

CHARLECOTE, WARWICKSHIRE, ENG.

WE print below the descriptive text belonging to the illustrations of Messrs. Ernest George & Peto's work which were published last week.

NO. 6 CARLTON HOUSE TERRACE.

OUR illustration of a portion of the work in this beautiful house shows part of the marble staircase which is now being built. The staircase arrangements were previously undignified and lacking in style, and the proprietor has reconstructed internally the whole of that part of the house, making a noble marble staircase, with marble balustrades and wall linings, with delicate carving and detail in the style of the Italian fifteenth century. Above this marble staircase, part of which is carried on arches, the walls are covered with green and gold brocade and some fine tapestries of the early sixteenth century. The doorways opening on to the staircase are all of white statuary, the pilasters carved with delicate Raphaelesque detail, the

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doors themselves being inlaid with rich intarsia work. The ceiling of the grand staircase is coffered with wood and gessowork in blue and gold, the coffers themselves being filled with a star-shaped flower, the petals of which are composed of pearl shells.

The noble entrance hall, into which we get a peep in the corner of the picture, is entirely lined with marble, the large panels of which are pink Soudanese, divided by statuary pilasters, the latter carved with fine Renaissance detail. The chimneypiece is a good specimen of marblework in the Italian style of the fifteenth century, modelled by Mr. George Frampton. It has a frieze about 3 feet wide of boys with garlands. This entrance-hall is 38 feet by 25 feet, and also has a ceiling of blue and gold gessowork: the pavement is of choice colored marbles.

The dining-room is being panelled with mahogany up to the ceiling, with a deep frieze of carved panels, partly gilt, in the style of Henri II, the margins of the lower panels being inlaid with satinwood; the ceiling has wood coffers, with the whole central portion domed and decorated with finely-modelled figures in ivory color on a gold ground.

On the first floor are the library and drawing-room 38 feet by 25 feet and 50 feet by 25 feet; the lower portion of the former is panelled with Italian walnut, in the style of François Premier, beautifully carved; part of the walls to the height of the panelling are arranged with bookcases matching the dado, and above the walls are covered with gilded leather; the ceiling is of inlaid walnut coffered work, the panels and frames being inlaid with boxwood. The drawing-room has been treated in the Palladian style of the Italian sixteenth century; the ceiling has its panels filled in with paintings, and the walls divided with pilasters; the panels between these are filled in with gray and gold brocade. This room has a superbly rich effect, and proves how quiet and lovely gold is when used in broad enough masses. An interesting use is made of cloisonné enamel in this house, as the walls of two bathrooms have been completely lined with it above a low marble dado; one bathroom is Pompeiian in style, and has representations of standard pomegranates, oleanders, orange-trees, etc., and the other is Japanese, with very life-like treatment of lotus plants, with fish and storks.

The house generally has been finished in a superb manner, there being few in London to rival it in the care of its detail or beauty of finish. The time that has been occupied in carrying out these great undertakings has been incredibly short, only eight months.

The whole of the work has been designed by Messrs. Ernest George & Peto.

SHIPLAKE COURT.

The exterior of Shiplake Court appeared in last year's Royal Academy among the designs of Messrs. Ernest George & Peto, who now give a drawing of the hall in this house. It is 70 feet in length, and has an open timber roof, with moulded purlins and wind-braces, its oaken beams, of ample substance, reminding us of good old work. Above the oak panelling the stone walls are shown. There is a screen and musician's gallery at one end. The tall stone chimney is shown in the drawing, while at the end of the hall, behind the spectator, is a small spiral staircase giving an approach to the boudoir and family rooms above. The tall windows are shuttered to the height of the lower transom, thus continuing through the line of the panelling.

THE POLES.

In the Architectural Room of the Royal Academy is a drawing, by Messrs. Ernest George & Peto, of The Poles, in Hertfordshire, a house now being built for Mr. Edmund Hanbury. The building is Jacobean in style, with parapets and shaped gables. The walls, with their cornices, are all of brick excepting the mullioned and transomed windows, which are of Ham Hill stone. A principal feature of the house is the oak-panelled hall, the ante-hall at one end being separated by a screen, while the main staircase, between oak posts, leads from the other end. The hall is lighted by long windows above the panelling, and a large bay-window, with window-seat, opposite to the big chimney. The ceiling is of moulded oak beams. From the ante-hall a large garden-porch leads to the south terrace. The drawing-room is much the same shape as the hall, but variety is made in the treatment by giving this long room a vaulted or barrel ceiling of enriched parquetwork. The dining-room, drawing-room and library are symmetrically arranged on the principal side, so that when their folding doors are thrown open there is a vista of 120 feet — a perspective which is always interesting. The billiard-room is at one end of the hall, while Mr. Hanbury's business-room is between the dining-room and the offices. A second or family staircase is provided in this part of the house. The offices are in a wing which projects, giving an L-shaped plan to the house. The kitchen is carried up through the first floor, giving it the height of two stories.

A HOUSE WITH STUDIO, NEAR GUILDFORD.

The house near Guildford is to occupy a wooded knoll by the "Hog's Back." The studio is commodious, with a gallery at one end. Beneath the latter is the lavatory; also stairs leading down to a canvas-room, which has also a door from the garden. A fall in the ground at one end of the house helps to form this basement room. The rest of the house is compact in its scheme, being designed as the occasional retreat of an artist, The lower part of the building is of Bargate stone from a neighboring quarry, and the upper story is of oak quartering. The whole is covered by a simple hipped roof of heather thatch.

SOCIETIES

TEXAS STATE ASSOCIATION OF ARCHITECTS.

The fifth annual meeting of the Texas State Association of Architects was held in Dallas on the 13th and 14th of May, and the following officers elected: *President*, James Wahrenberger, San Antonio; *Vice-President*, Nathaniel Tobey, Dallas; *Second Vice-President*, George E. Dickey, Houston; *Secretary*, George W. Stewart, Dallas; *Treasurer*, G. M. Tozer, Dallas; *Executive Committee:* J. J. Kane, Fort Worth; B. B. Haggart, Fort Worth; M. McQuirk, Dallas; W. W. Larmour, Waco; J. Larmour, Austin.

The following address by the President, James Wahrenberger, was delivered:

Gentlemen of the Texas State Association of Architects: Before proceeding with the regular order of business, permit me to address a few remarks to you gentlemen, here assembled as representatives of an important and noble profession. I feel confident that our actions and deliberations will be of such a dignified and harmonious character as becomes the nature of our occupation, and that the best motives, kind feelings and a spirit of true fellowship will govern us in all our discussions, for the benefit of our Association and of the profession in the State. And, after completing our labors, may we all return to our homes with many pleasant recollections of this, our annual convention.

Important questions may be brought before us for consideration and discussion, upon which depend to a great degree the future standing and welfare of our profession, and let no member of this Association hesitate to express his views fully and without reserve upon all points in this connection, as the interchange of ideas and personal experiences can only be of great benefit in devising measures to be taken for the future welfare of the profession.

I desire, furthermore, to impress upon your minds the fact that it is of the utmost importance that more attention be paid to the affairs of the Association by its members, and that its meetings be better attended than heretofore. In a comparatively new field, where the nature of our occupation is not fully understood, and the labors of a professional man are to be peddled like a lot of merchandise, concerted action on the part of educated professionals becomes imperatively necessary. The practices of ignorant and unscrupulous pretenders must be met with united, intelligent and persistent efforts of a thoroughly organized association, to place the profession before the general public in the dignified standing to which it is justly entitled.

It becomes the architect to stand before the public as a man educated to follow a profession which makes demands for talent and attainments second to none in existence; for while it is necessary that we acquire a thorough knowledge of the principles of construction, and keep abreast of the times with reference to all new improvements made in the mechanical branches connected with the profession, there are also those æsthetical studies connected with the builder's art that require much time and application in order to become proficient and to keep up with the spirit of the times.

If the practice of architecture were simply to supply the ordinary wants and comforts of man, without cultivating the mind for an artistic taste, the same would cease to rank with the fine arts, and descend to the level of an ordinary trade. Besides providing for the physical wants and comforts of our fellow-beings, it is for us, also, to satisfy those desires of a refined intellect that move beyond the materialistic wants of every-day life. Not to forget, however, that the laws of æsthetics are taught us in the works of nature, and the effect of beauty can, therefore, in no manner be that of shallow sensualism, but that of a true moral spirit. We can never obtain the desired effect upon the beholder unless the entire composition of our work, together with all its details, be so treated as to express a certain deep and earnest signification in the outward appearance of the design, as well as in its interior decorations and arrangements. By imprinting upon our work the prevailing ideas of intellectual taste, we create and further develop the peculiar styles that characterize the spirit of the age.

Monuments left by past generations teach us the history of the people gone before us, and mark their progress in culture and refinement; they give us an insight to their religious views, and to the peculiar habits and customs existing in their times. The history of architecture as a fine art begins with the temple, the house of God, which, in its various forms and details, has furnished ideas that have led to further developments for the adornment of public buildings and the decorative features of our homes.

In order to acquire a proper knowledge of the various architectural styles, and a correct understanding of the many different forms

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therein employed at various times, the reason of their origin and their purpose, we must trace back the history of architecture, and become acquainted with the prevailing ideas and views of the people in this connection that have led the old masters to the development of these peculiar forms and compositions. As we do this, we find that in many cases one style has served as a basis for the gradual development of another, and as the peculiar ideas of taste and of the grand and beautiful become more developed in certain directions, we are able to follow up the progress of the various architectural styles from their origin to their highest state of perfection. Those of the profession who are so fortunate as to enjoy travels in older countries abroad, to view the monuments left by the old masters at different periods of history, and also the grand works of modern times, derive the greatest benefit and the most valuable assistance in their studies of this kind. That the same are of great importance no educated architect will deny; they are essential to the designer in order to fulfil the first requirement of a design properly executed, which is, that a building, as a mass, shall, at a glance, impress the mind of the beholder with its importance, and disclose to him the purposes for which it was erected.

It has always appeared to me absurd that public-buildings, like court-houses, post-offices, etc., at this age of steam-cars and electricity, should be of such antique architectural styles as to remind us of the dark days of the Inquisition and of the carrier-pigeon. Of that hideous nightmare, the so-called modern Queen Anne residence, perhaps the least said the better; and perhaps, also, of the peculiar misapplication of the misunderstood Byzantine and Moresque forms, in which some of the younger brethren of the profession seem to take a special delight to show their ignorance in architectural style and æsthetics, and which to a great degree may account for the depraved taste displayed in much of our modern architecture.

The arts of painting and sculpture are closely allied with that of architecture, and have at all times lent a helping hand in embellishing and decorating important works. It is, therefore, required of the educated architect to show good judgment and taste in employing the assistance of these kindred arts. They have been developed hand-in-hand with that of architecture. Mark the difference in the manner of employing them at different periods of history in connection with the architectural styles then in vogue, and compare the severe, stiff, cold lines and coloring of the earlier days with the graceful forms and beauties in the works of the Renaissance.

By reason of the amount of study needed to become well skilled in these beautiful and important branches of our profession, the practice of architecture should be entitled to stand as one of the most prominent practised among the cultured and refined classes. That the educated architect does not yet fully receive the encouragement, through a proper appreciation on the part of the general public, which his profession entitles him to, and which he enjoys in older countries where the profession and its requirements are better understood, is a fact, of which we have almost daily demonstrations in our practice. However, of late years, we may note a marked improvement in this respect, with the wonderful growth of our country. The temporary log cabin of the hardy pioneer will soon exist only in the recollection of a few, and the time of the weather-boarded corner-grocery and drygoods establishment, with a stock of patent medicines and the United States Post-office combined, is quickly passing by. The character of our public buildings is undergoing a marked change, and the importance of the profession is steadily increasing until it will eventually arrive at that high plane of excellence to which it rightfully belongs.

In the meantime let us strive to establish those proper and correct relations which should exist between the honorable educated architect and his clients; we will thereby gain the confidence of the public that is necessary for the attainment of our objects.

We have repeatedly and in vain petitioned for legislation, to regulate the practice of our profession, and to protect us, as well as the general public, against the abuses and pernicious practices of uneducated and unscrupulous pretenders. While we should renew our efforts with increased energy and vigor, what the prospects for success will be in the near future remain yet to be seen. The average legislator is not given to much thought in matters of this kind, and as long as only questions of a political nature remain uppermost in his mind, an encouragement in the promotion of science and the arts cannot be looked for by any legislation in this direction, in the near future. And positions held under the government by professional men, chiefly obtained through party influence, instead of ability and personal merit, will for some time, still lack that moral influence and high honor due the profession.

However, it is for us not to become discouraged in our labors, but to renew the same with a determined resolution hand-in-hand with those of kindred associations, and with the fond hope that with the wonderful growth and increasing prosperity of this country, our unremitting efforts will be eventually crowned with success. In the meantime, let us meet in council, and advise with each other, as to the proper steps to be taken towards the public, to overcome the evils born of unprofessional and unscrupulous methods, and present such professional facts, methods and ideas in a manner that the public mind must become educated to the importance of our occupation. We must form rules to guide us in our practice, that will command the respect of our clients, with whom we have our daily business transactions, and the public at large will soon begin to appreciate our position. Let us, also, not hesitate to exclude from our ranks, and ignore the pretensions of those who are not fitted by education, or otherwise, to practice the profession; such, who look upon the occupation simply as a milch-cow, and especially those whose past career in the profession has been of a dishonorable character.

During the few years, since the organization of our Association, much good has been accomplished; the interchange of ideas and personal experience has been of great benefit to all of us; we have become united in one common fellowship, and have learned to struggle hand-in-hand, for one common cause. Our aims and objects are already beginning to be understood and appreciated by educated and well-thinking men. Let us remain united in our persistent efforts to ultimately attain the objects of our Association, and aid in raising the profession to that high standing which it so fully deserves.

In conclusion I take the liberty of stating to you, gentlemen, that my views in regard to architect's competitions, as now generally conducted, have not changed in the least since expressing them at our last meeting at Waco. I still believe, that, the more architects respond to the shallow inducements offered in advertisements for these sham competitions, the more difficult the task will become, to raise the profession to the standard so much desired. Good professionals should discourage such competitions by paying no attention to them, and all competitions where awards are not made by juries of competent professional men, should be entirely ignored. The temptation, I admit, is sometimes great, to convince an ignorant committee of the superiority of one's ideas, expressed in his plans and specifications, but we may only succeed in our aims by sacrifice commensurate with the results to be accomplished. The methods of proceeding in these unregulated competitions, controlled by persons totally disqualified, have led to much discussion and ill-will among our professional brethren, and it is necessary that we have the proper respect and friendship for each other, in order to secure the confidence and respect of the public, and to succeed in the task that our Association has laid out before it.

COMMUNICATIONS

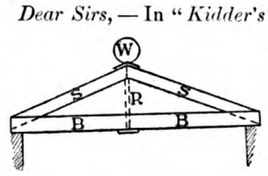
[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

CONCENTRATED LOADS ON TRUSSED GIRDERS.

LOS ANGELES, May 20, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — In "*Kidder's Architect's and Builder's Pocket Book*," page 340, for concentrated load on trussed girder, is given the formula for tension in B as $\frac{w}{2} \times \frac{\text{length } B}{\text{length } R}$, why should it be half the weight and not the whole weight? By answering the above you would greatly oblige



A STUDENT SUBSCRIBER.

[THE formula is given in this way simply for convenience. It might just as well be $B = W \times \frac{\text{length } B}{2 \times \text{length } R}$. Construct the graphical diagram and you will see at once the relation of the strains. — EDS. AMERICAN ARCHITECT.]

"THE ARCHITECT'S SKETCH-BOOK AT HOME AND ABROAD."

ST. PAUL, MINN., June 6, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sir, — In your list of architectural books in the *American Architect* for July 30, 1887, a book is mentioned which is called "*The Architect's Sketch Book at Home and Abroad*," by Thorpe.

Will you be kind enough to inform me through the *American Architect*, where and by whom this book is published.

Yours truly, RICHARDS GORDON DEACON.

[WRITE to B. T. Batsford & Sons, 52 High Holborn, London. — EDS. AMERICAN ARCHITECT.]

NOTES AND CLIPPINGS

CORROSION OF LEAD. — When plumbers strip the roofs of churches or other buildings covered with lead, which has lain undisturbed for many years, they usually find that side of the lead which is contiguous to the boards covered with a white pellicle, as thick sometimes as a half-crown; this pellicle is corroded lead, and is as useful for painting and other purposes as the best white lead. The lead on the south side of any building is found to abound most with this white crust, that on the north side having very little or none at all. It is believed also that lead which lies on deal boards is not so apt to be covered with this white incrustation as that which lies upon oak; if there be any truth in

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this observation it may perhaps be explained from hence that oak contains a much stronger acid than deal, and this strong acid being distilled, as it were, by the heat of the sun in summer attaches itself to the lead and corrodes it, or this corrosion may be the effect of sun and air, which by their constant action, calcine or corrode the lead; and this calcined lead not being washed off by the rain may, in the course of a great many years, form the crust here spoken of. It might be worth while, in a philosophical view, to examine more minutely than has been done the difference between old lead, which has lost some of its parts by long exposure to the air, and new lead. The plumbers have assured me that if a pig of old lead and an equal pig of new lead be put together into the same iron pot, and exposed to the same degree of heat, the new lead will be melted much sooner than the old lead. Another difference betwixt them respects the quickness with which they may be reduced to a calx, the new lead being observed to calcine much faster than the old. — *The Architect.*

The Church of St. Audoen's at Dublin. — The city of Dublin, rich in tumbledown courts and historic halls leaning towards disuse and decay, has now, since the enthusiastic patching up of the two great cathedrals, but one genuine ruin. Of course, this is also a church, for pieties are long on the ebb tide. In the midst of a neighborhood which is foreign soil to fastidious folk, full of wild sights, squalor, and the aroma, atoning for all others, of magnificent memories, stands St. Audoen's, planted on a slippery and hilly alley, south of the Liffey, at the junction of several roads. The present tower of the seventeenth century, where still hangs a bell dated 1423, and in the hollows of whose ancient peaceful stone-stairs pigeons continually make their nests, has been kept, exteriorly, in repair; the battlemented walls, the decent entrances, and the impossibility of commanding a wide view of the place from any point whatever, combine to hide, from everybody but the born mouser, the existence of a spacious and very beautiful Gothic fragment, older than Magna Charta. Its name comes from the good gentleman Ouen or Audoenus, archbishop of Rouen, who died in the seventh century, and whose body lies in the famous cathedral dear to Ruskin and to all men of his own town. The Anglo-Normans, from the year 1171 on, were not so busy with their theft and pillage but that they must needs edify Ireland with sacred architecture. As early as the time of Henri de Londres, the vigorous archbishop of Dublin, who built the castle and snuffed out Brigid's everlasting fires at Kildare, there is mention in the records of this church. It was certainly put up at the close of the twelfth century. The aisle parallel to the choir and of equal length, came into being, or into full renovation, 300 years later, at the cost of Lord Portlester. His beloved wife was buried there in 1455, and the two effigies were made to mark her grave, though he himself was to die long after and far away. In their rich and quaint dress, on a slab whose long Latin inscription (*Rolandus Fitzeustace de Portlester et Margarita ejus uxor*, 1455) is yet decipherable, they lie now in the securer shelter of the porch; their neighbors are the little gem of a Norman door, the first which has shed the Christian hope on twenty generations, the low, dark tower entrance, and the figure, more venerable than their own, of a nameless prelate, flat-featured with time. All about, the ancient burial stones hold up their dim letters to the light, and seem not to rejoice at all at the snug whitewash with which modern scruples have adorned the walls. East of the porch is the curious and roofless fragments of a chantry authorized by letters patent from Henry VI, in 1430, and nominally dedicated to the praise of God and the honor of St. Anne. — *Louise Imogen Guiney, in Boston Herald.*

Cordova, S. A. — Even with its modern innovations Cordova is one of the best types I have seen of the Spanish-American town as it was known before the era of railways, immigration bureaus and land speculation. A chess-board furnishes the ground plan of the city. Four of the central quadras or squares are reserved for the main Plaza, with its Cathedral and Cabildo. The remaining rows of squares are filled with churches, shops and houses. The dwellings are small quadrangles built around enclosed courts. Nearly all the houses have a single ground floor, the servants' quarters being in line with the kitchen. A few of the more pretentious dwellings have an additional half-story in front, where the servants sleep. The entrance is an archway, with an iron fence or gate across the front, and a glimpse of the patio, or shaded court, within. Many of these courts have fine trees and shrubbery; the poorest have pots of flowers, and the best have statuary, fountains, ornamental vases of great size and rare plants. The courts have stone floors and are clean and cool. There are reception and dining rooms under roof, but family meals are ordinarily served out of doors, and guests are entertained in the shaded courts fragrant with flowers. A few of the largest contain two or three quadrangles built around as many courts. There is a greater range of coloring in the exteriors of the houses and shops than I have seen since I left the northern coast towns of Brazil; but the streets are cleaner, the dwellings and patios more tidy and orderly, and the general aspects of the city are refreshing and restful to the eye. In the olden time the pride of Cordova was its Alameda, or public garden. True to the checkerboard design, that, too, was a quadrangle, with an artificial lake in the centre and with double rows of noble trees around the outer edges. Near by were a series of Moorish baths, with reservoirs supplied from the lake in the Alameda. This beautiful pleasure-ground was devastated ten years ago by a tornado, which uprooted a large number of the trees and destroyed the symmetry of the lines of shaded walk. The baths are in ruins and the scene is now one of departed glory. Engineers have planned a new Alameda with a large artificial reservoir, and work is now in progress which will supply the city with a modernized park. Many of the open water-courses which formerly ran through nearly all the principal streets and furnished means for irrigating private gardens have been closed. Cordova is gradually losing the characteristic features of its ancient Spanish estate, but with all the encroachments of the modern, it remains essentially antique and mediæval. — *New York Tribune.*

Bridging the Bosphorus. — Engineers are, it is said, now considering the scheme for bridging the Bosphorus, thus connecting Europe and Asia and their railway systems. The Turkish newspaper *Hakikat* gives some particulars of this project, which appears to be an offer by a French syndicate to build a bridge of 800 metres in length and 70 metres high between Roumeli and Anatoli Hissar. The striking feature of the bridge would be that it would consist of one span, and thus, although of much shorter length than the Forth bridge, it is described as a greater work, because its single span would exceed in length by one-half the longest span of the Forth bridge. — *Commercial Advertiser.*

Montstuart Palace. — Lord Bute's mansion, called "Montstuart," near Rothesay, is the largest and costliest private palace in the world. It is in Gothic style and covers nearly two acres. The halls are of marble and alabaster and the rooms are finished in mahogany, rosewood and walnut, with carved marble fireplaces. The cost of the mansion was about $9,000,000. — *Commercial Advertiser.*

TRADE SURVEYS

The fact that bank clearings throughout the country for the month of May were 21½ per cent greater than for May, 1889, is sufficient, in itself, to show the general expansion of business which has taken place within the past twelve months. Reports from manufacturing corporations and firms in all sections show that expansion is the rule. Machinery of enormous capacity is taking the place of older machinery; additional floor-space is being supplied in hundreds of establishments, and in every way capacity and facilities are being increased. Within the past 30 days orders for fully 500 locomotives have been placed; during that time orders for cars have been placed by a large number of railroad companies, and from reports received from car-builders, it is evident that there is more business coming to hand now than at any time for six months. The car-trust interests are crowded with negotiations for additional work. The railroad companies, and those companies having control of rolling-stock, are in the market with heavy requirements, and the car-builders are now figuring upon some of the largest orders ever placed. The makers of car-wheels, axles, brakes, and railway equipments and supplies generally, are making active preparations for meeting heavy future requirements. A number of improvements in railway equipment have been practically adopted within the past few months, and the necessary changes of old appliances for the new are giving a great deal of work to manufacturing establishments in this line. The electrical works are all crowded with work. Recent combinations have greatly improved the position of some of the stronger concerns, and harmony is being gradually established between heretofore conflicting interests. Electricity for street railway purposes is meeting with favor in many localities, and in numerous instances cable systems are being abandoned for the electric motor. All the manufacturers of machinery state that the orders for machinery are now more abundant than ever before known. A great deal of heavy machinery is being contracted for; several new rolling-mills are to be erected in the Southern States; the projection of blast-furnaces continues as though an actual scarcity of crude-iron prevailed. The iron trade has gained strength within the past week. Steel rail-makers have just booked orders for 50,000 tons of rails, and very heavy orders are now awaiting their acceptance. Prices have advanced on small lots. Throughout New England all the industries are fairly prosperous, but the makers of machinery lead all others in the volume of business and the margin of profits. The paper manufacturers report a fair degree of activity, but complain of narrowing margins. The textile mills are plodding slowly through numerous difficulties; the hosiery manufacturers are somewhat better off. The boot and shoe manufacturers are crowded with work; stocks at distributing points are almost exhausted. Manufacturers of all kinds of hardware, heavy and light, report an active demand.

Throughout the Middle States, iron-makers and coal-miners are busy. An expansion of the coal trade in both anthracite and bituminous is reported. The hurrying-in of orders for summer and fall work is keeping the shop-capacity of the Middle States more actively employed than was the case in the early spring. Western Pennsylvania is particularly active in its heavier industries. Throughout the oil and natural-gas regions a great deal of pipe-line laying is underway. The Standard Oil Company has purchased four large refining companies, and is interesting itself in a scheme to push the exportation of oil in tank vessels on a large scale. An increased industrial activity is reported in Kentucky, Tennessee and Alabama; numerous coal-mines are being opened, short lines of railroad are being built with a view to mineral and timber development, and a multitude of small industries are springing up, chiefly by the aid of Northern capital. No untoward influences have as yet arisen to check enterprises in these States; very few failures occur; the railroad companies of the South are earning, according to reports, more money per mile than roads elsewhere. Late reports from Texas and the Southwest point to increasing immigration from the older States to these regions. The railroad managers are doing their utmost to aid in the development of these sections, and private enterprise is securing and preparing to make the most of the splendid opportunities which this development opens up. Authorities upon such subjects state that an impetus has lately been given to immigration into the Northwest also. Much as has been said about agriculture being overdone, it is stated that a vast amount of land is now being taken up by new settlers, mostly Americans from the older States. The farmers have gained many minor advantages during the past two or three years: land continues low; manufacturing products have declined in price; railroad freights are more favorable, and other influences are contributing to a larger and steadier demand for farm-products. In commercial and financial circles a very hopeful feeling prevails. The general crop prospects are excellent. Railroad earnings are large, and this fact is inducing a quiet speculative movement for certain stocks. Railway management is making slow but steady progress. National legislation on economic questions is moving slowly in the right direction. Commercial failures are not in excess of the usual monthly average, and the volume of money, so far as the great business centres are concerned, is sufficient, although in remote localities a scarcity exists.

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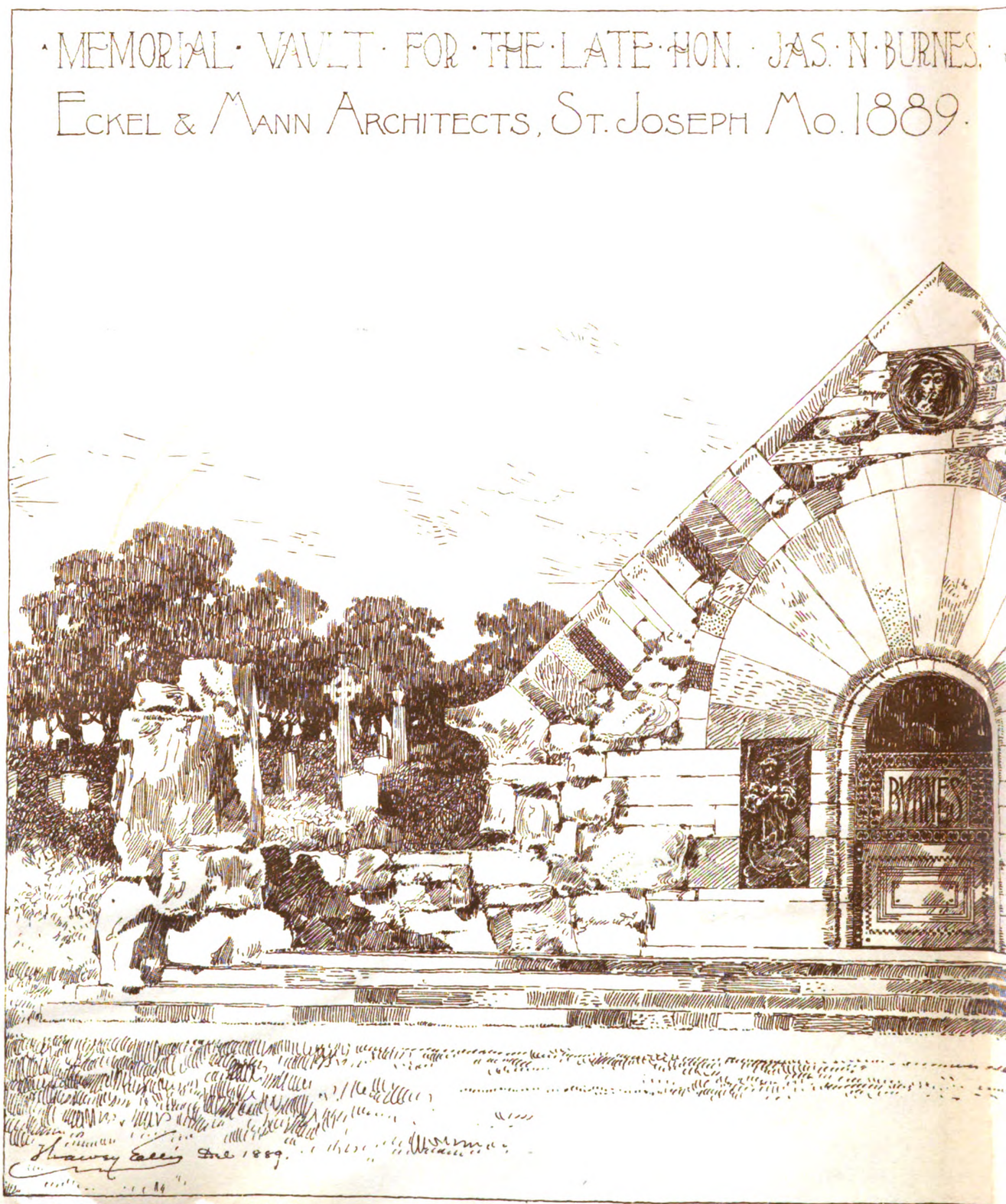

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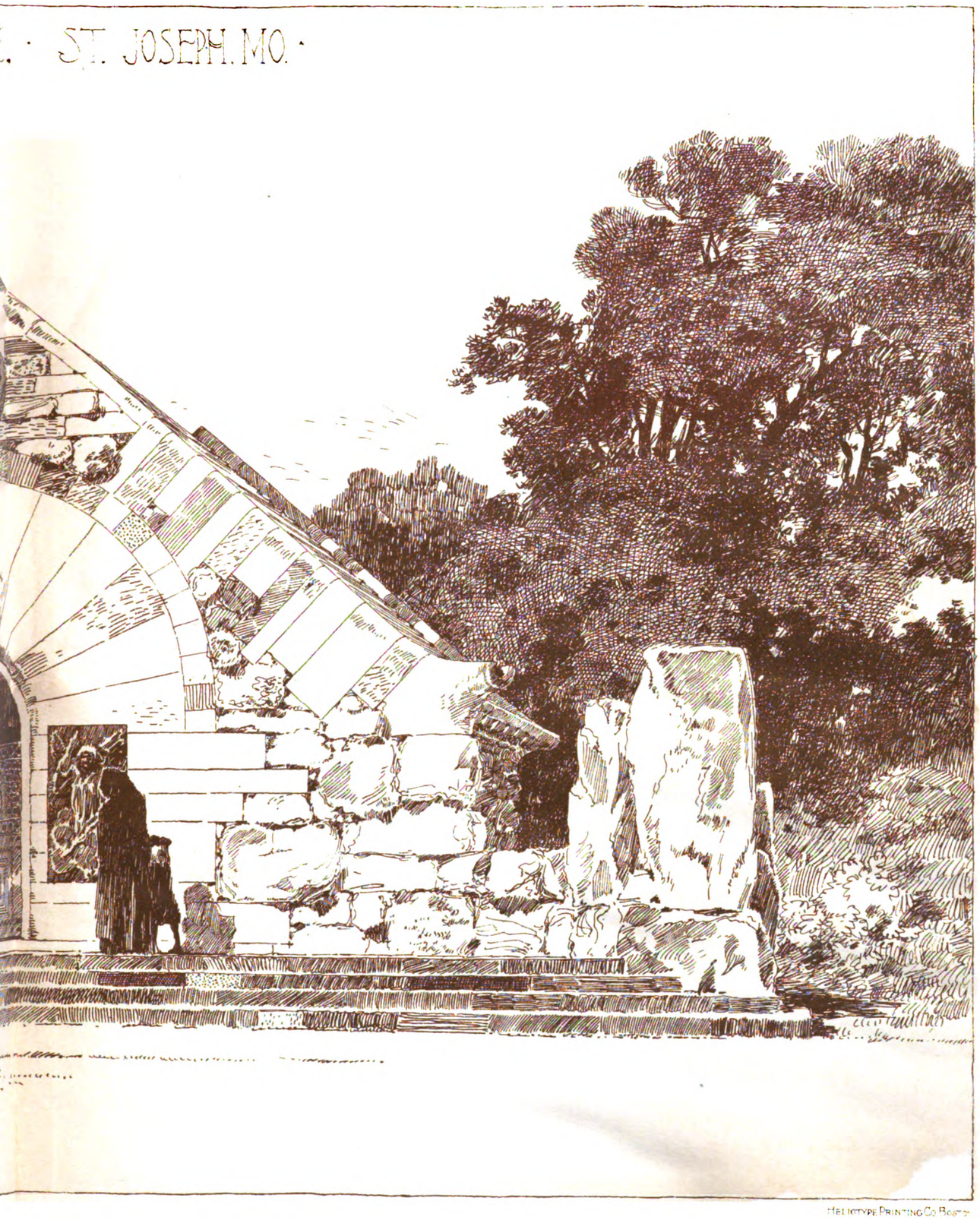

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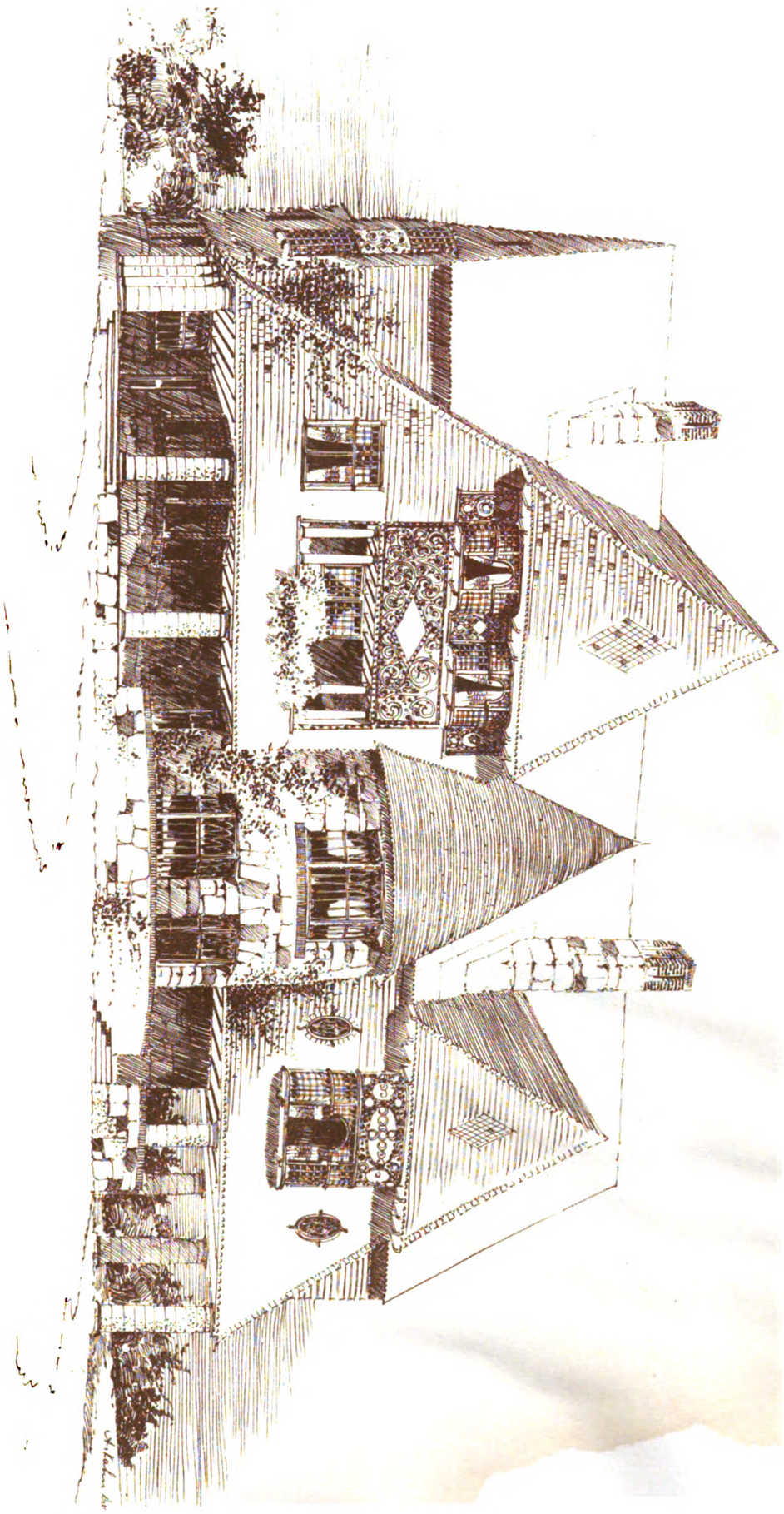

SUMMER HOUSE FOR MR. H. McMILLAN
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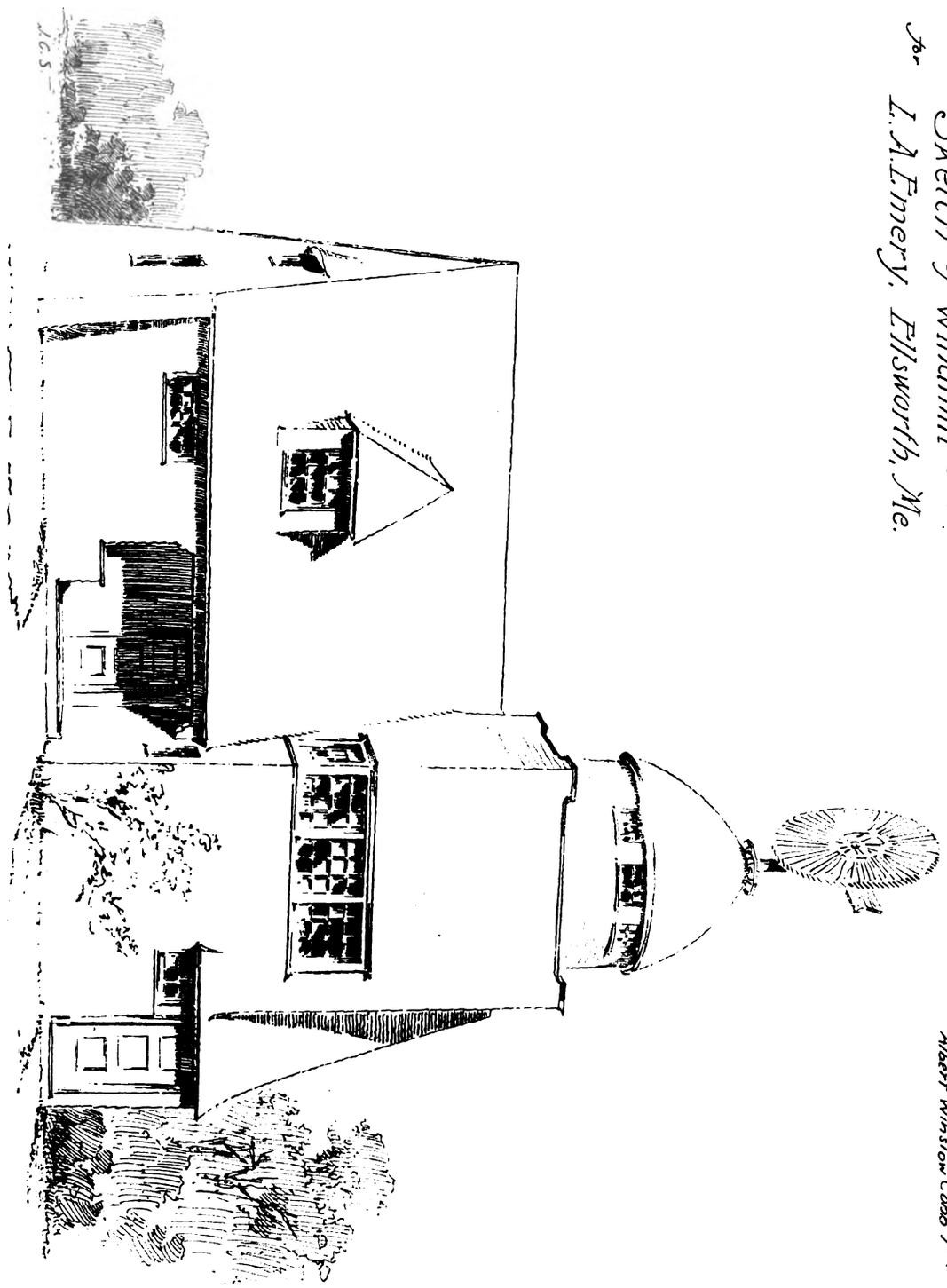

Sketch of Windmill etc.
for
L. A. Emery, Ellsworth, Me.

John Calvin Stevens, } Archts
Albert Winslow Cobb }

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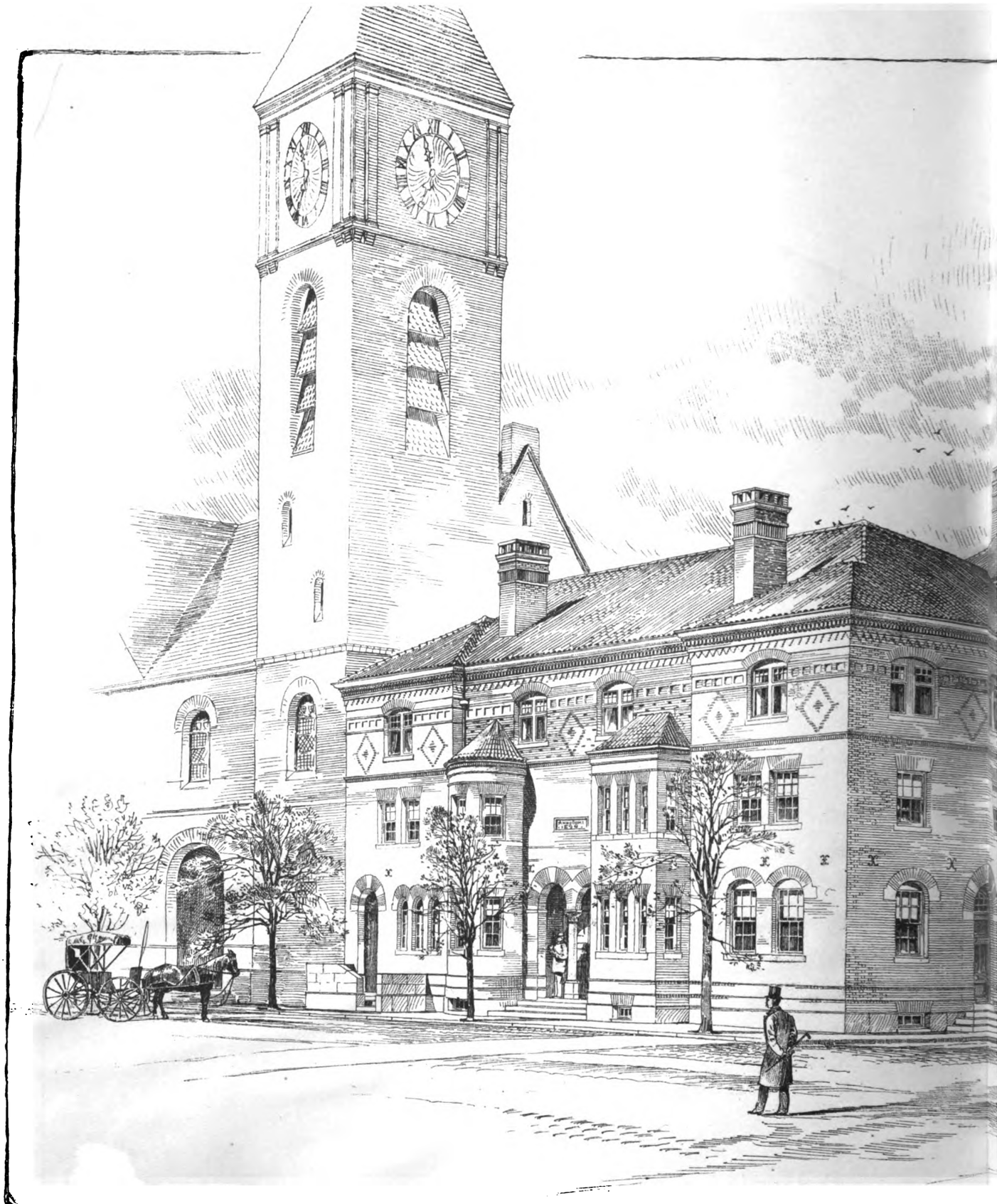

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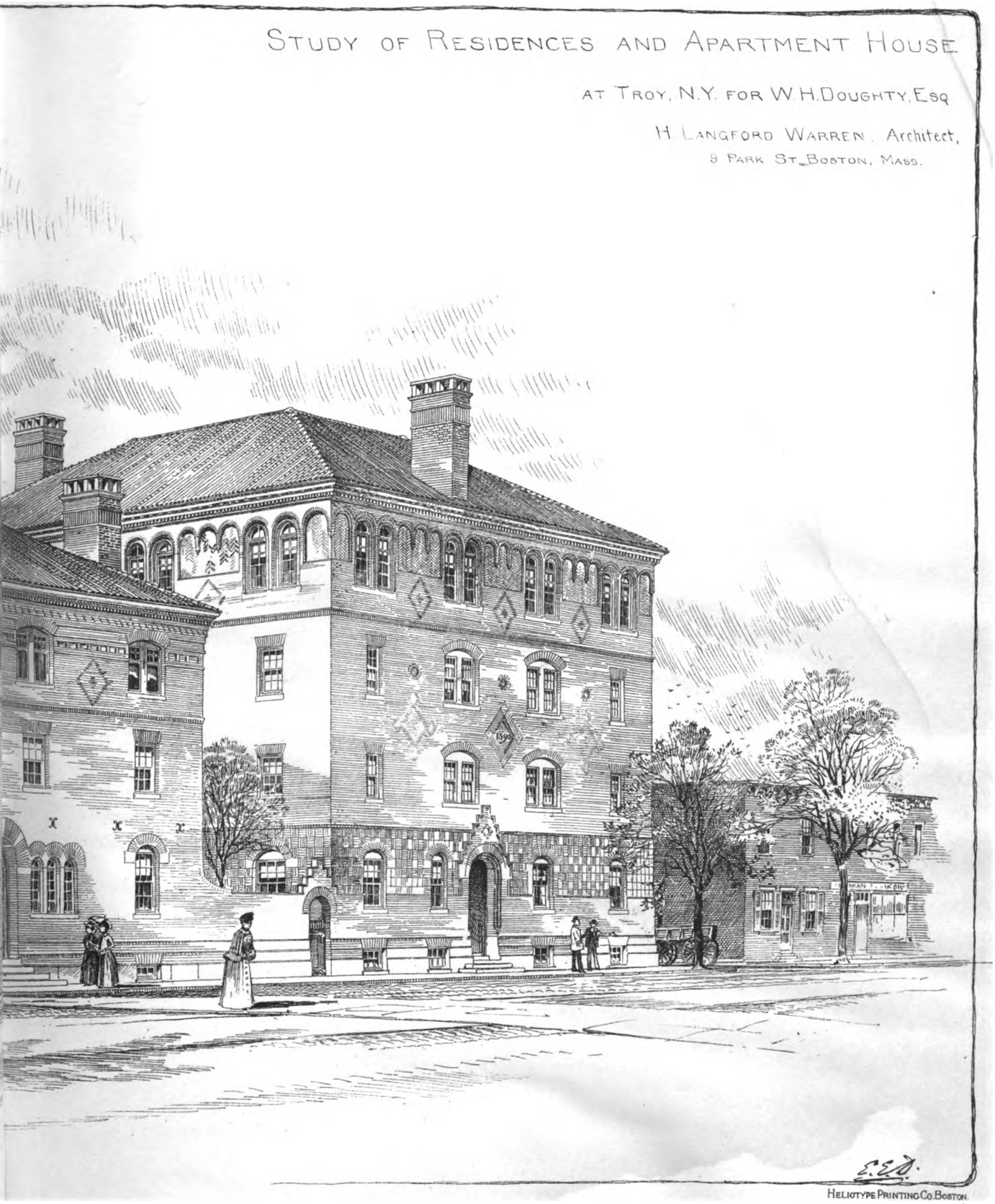
STUDY OF RESIDENCES AND APARTMENT HOUSE

AT TROY, N.Y. FOR W.H. DOUGHTY, Esq

H LANGFORD WARREN, Architect,
9 PARK ST, BOSTON, MASS.



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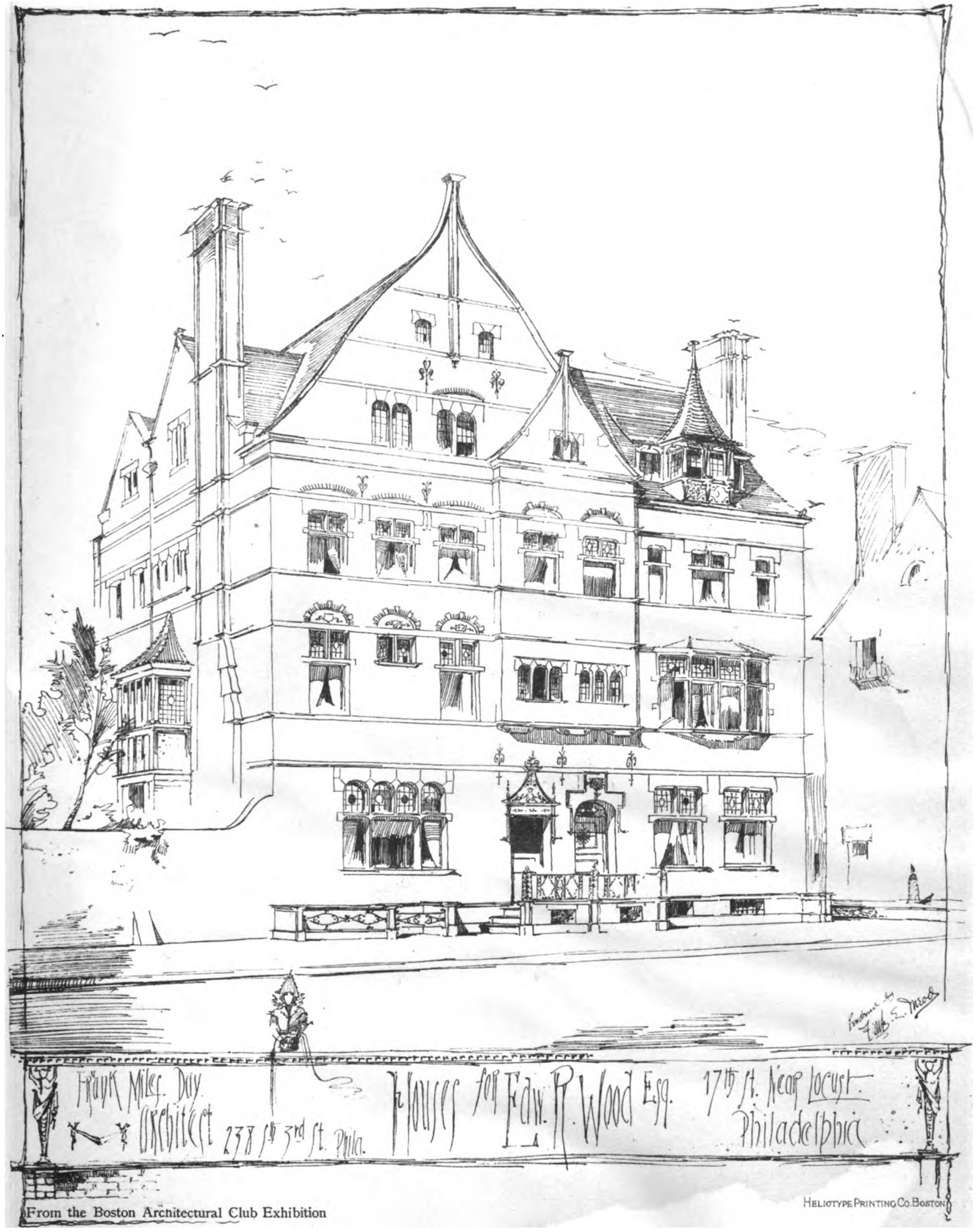

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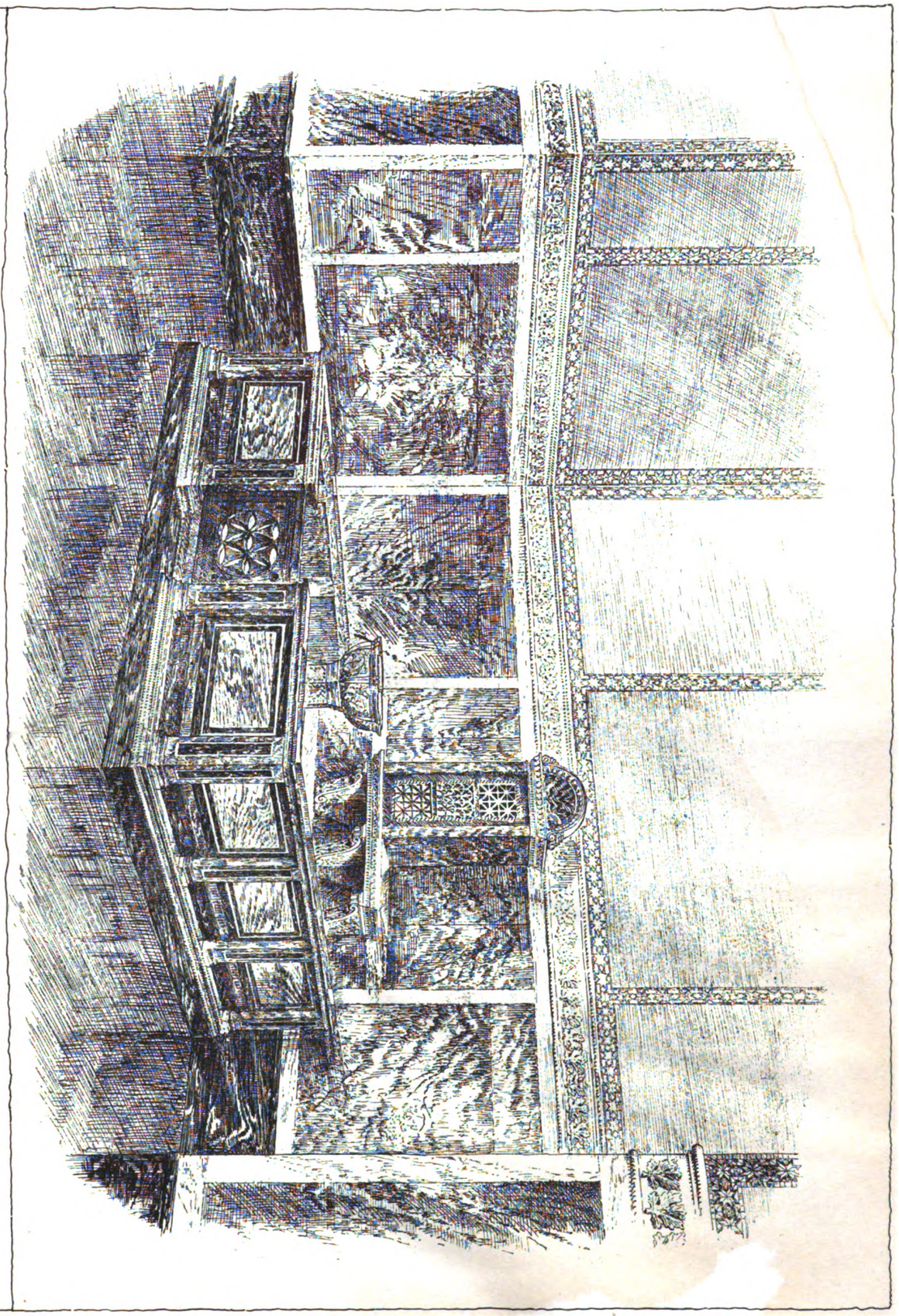

SKETCH FOR BAPTISTERY, CHURCH OF ST. PAUL THE APOSTLE · NEW YORK.

HEINS AND LA FARGE ARCHITECTS.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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JUNE 21, 1890.

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WE imagine that some of our readers will be surprised to hear that architects in Canada are "protected" by a tariff, which places an *ad valorem* duty on all plans of buildings imported into the Dominion, calculated upon the proposed cost of the buildings represented by the plans. What the rate is, we do not know, but the tax is conscientiously collected. The duty is avowedly imposed for the protection of Canadian architects, and those of our own people who are called upon to practise in Canada will do well to look out for it. It is obvious that a duty amounting to a very small percentage on the cost of a building would be a very large percentage on the architect's fees, and architects should be particular to have it clearly understood with clients in the Dominion, that all duties and expenses of importation of drawings are to be at the cost of the latter.

A CHIMNEY is being built at Freiberg, which will give a draught depending upon a column of heated vapor seven hundred and ten feet high. The chimney itself is only four hundred and fifty feet high above its foundation, but it stands on a rock two hundred and sixty feet above the smelting works which will use it, so that the total height of the flue above the fire will include the pipe leading to the chimney proper. The interior diameter of the chimney is fifteen feet, the exterior diameter, at the base, being forty feet. It is a disputed point among engineers whether very high chimneys are worth their cost, by reason of the advantages which they offer in strengthening the draught through them, and the opinion is very general that the limit of usefulness in this respect is reached at about three hundred feet, any height beyond this being, perhaps, valuable for carrying noxious fumes so much further from the ground, but not for any other purpose. In the Freiburg chimney, there seems to be no special necessity for getting rid of noxious fumes, and the question of the advantage gained in draught will come up in a way which should admit of its decisive settlement.

ACCORDING to *La Semaine des Constructeurs*, Brussels is to be made a seaport. It is already connected with the sea by means of a canal, which enters the Schelde above Antwerp; but it seems to be ambitious to share in the great commercial prosperity of Antwerp, and the canal is to be deepened and widened, so that vessels of a thousand tons can come directly to the city. The work is to be done, under the direction of an English engineer, by an English syndicate, at the head of which are Lord Brassey and Lord Sheffield.

IN speaking of the criminal action just concluded against the managers of the great copper speculation of two years ago, the *Revue Industrielle* recalls the circumstances of the conspiracy by which hundreds of innocent people were ruined. As most people know, the speculation was carried on by the Société des Métaux. This was originally a comparatively harmless affair, formed by uniting the two great metal-manufacturing establishments of MM. Secretan and Laveissière & Son. Only two hundred thousand dollars was ever actually paid in on the subscriptions to the stock, the remainder of the shares, to the value of five million dollars, being divided between the owners of the two establishments taken in charge by the Société. This was in 1881. More capital being required to carry on operations, bonds were issued to the amount of four million dollars; and early in 1888, when the great speculation was already begun, the capital was increased to ten millions. Meanwhile, M. Denfert-Rochereau, the president of the great banking-house of the Comptoir d' Escompte, was made a director in the new society. In October, 1887, the price of copper had fallen about to its lowest point, and M. Secretan conceived the idea of forcing it up by monopolizing the production, which was soon put into execution. In June, 1888, M. Siegfried, manager of the Comptoir d' Escompte, resigned, because he disapproved of the loans made to the Société des Métaux. Every one knows the result of the transactions of the next few weeks, which ended in the bankruptcy of the Société des Métaux, the Comptoir d' Escompte, and M. Secretan, the suicide of M. Denfert-Rochereau, and the arrest, trial and punishment of all the principal actors in the affair.

WE like to chronicle all the improvements in school-houses as soon as possible after they are given to the world. The latest appears to be one adopted in Mannheim, where a school-house has just been completed, which, in addition to all the other recent German devices, such as gymnasium, floors of hard wood laid on asphalt, and swimming-baths for boys and girls, contains four prison-cells for refractory pupils. This appears to be a complete novelty. The building contains what has, we believe, been hitherto unknown in German school-houses, but is quite common in modern French buildings of the kind, a lunch-room, where the young children will, in winter, be fed with bread and milk, to save them the exposure and fatigue of going home at noon; but prison-cells are appliances of instruction of which Mannheim seems to be, so far, the sole possessor.

THE largest sailing-ship in the world is soon to be launched in Glasgow. It is to have five masts, and is built for a firm of merchants in Bordeaux, who have not only larger sailing-ships, but more of them, than any other mercantile firm or association in existence. The hull of the new vessel is of steel, three hundred and seventy-two feet long, with a double skin, so arranged that water can be admitted into the space between the inner and outer skin, as well as into a large watertight compartment in the centre of the hold. This enables the ships of this firm to take in water-ballast to any required extent, and secures for them great advantages in lessening the duration and expense of their trading voyages, in which it is often necessary for them to discharge cargo at one port, and go thence in ballast to another, perhaps thousands of miles away, to take in a return cargo. The five masts of the new ship are of steel, all square-rigged except the mizzen-mast, and spreading three-quarters of an acre of canvas. Power for the steam windlasses is furnished by two boilers, but there is no auxiliary steam-propelling apparatus, and even the steering-wheel is operated by hand. The measured gauge of the vessel is thirty-six hundred tons, and the guaranteed capacity sixty-one hundred tons. The compartment for water-ballast, independent of the space between the two skins, has a capacity of twelve hundred tons; and the space between the skins will hold about seven hundred and fifty tons more.

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THE cable railway has made its way more rapidly abroad than the electric road, which has nearly supplanted it here.

In Paris, a cable line, exactly like ours, is now nearly ready for operation between the Place de la Republique and the most distant part of Belleville; and two more are to be immediately constructed, one at Montmartre, and the other at Menilmontant. All these places are hills, approached by streets of too steep a grade for rapid travelling in omnibuses or horse-cars, and the cable railway gives a very suitable means for improving the means of communication. In the Belleville line, which is about a mile and a half long, power is supplied by a fifty-horse-power engine, which seems small for the work required of it. The cables run over pulleys, as with us, situated midway between the rails, and the cars are furnished with the familiar steel "grips." Trains of two cars are to be run, each car having seats for twelve passengers, and standing-room for ten more, and a train will start each way every five minutes. The fare is moderate — one cent mornings and evenings, and two cents in the middle of the day.

IN these days, when a little sentiment about dwelling-houses is getting to be very popular in this country, some one could do a service to the cause of domestic contentment, and probably consult his own interest, by making a collection of names and inscriptions on houses in various parts of the world. Nearly every country has its own way of expressing the affection of citizens for their homes, but all the modes have their advantages. In England, it has long been the fashion to give names, even to very modest dwellings; and, although the taste displayed in the selection of a name is not always remarkable, and one is occasionally disgusted by the burlesque of the custom which enables a speculating builder, as he thinks, to sell a row of miserable apologies for houses to better advantage by christening them "Woodbine Villas" or "Claribel Crescent," the traveller is often pleased, and sometimes touched, at the modest refinement which knows how to make of "Daisybank" or "The Ferns" a habitation as attractive as any palace could be. In Italy, although inscriptions are rare, and people live in flats instead of detached houses, one sometimes sees the door of the tenement guarded by the Madonna, or some saint or angel, painted on the wall beside it, in a sufficiently rude style, but with an intention which merits respect and interest. In Germany and Switzerland, the place of names and holy effigies is taken by inscriptions, of which thousands are still to be seen, dating in some cases from the thirteenth or fourteenth century. In the more modern Swiss houses, it seems to be the rule to commemorate the names of the owners of the structure, and of the master-builder, following this either by an invocation of divine protection upon the house and its occupants, or by a sentence expressive of domestic comfort and peace.

THE *Bautechnische Zeitschrift* has collected many inscriptions of the kind, some of which are worth quoting in the original, for it is not easy to translate them without losing the rhyme and force of the German. Among the best is the brief one, "Eigner Heerd — ist Goldes werth"; a similar one, from Styria, can be exactly translated: "My nest — is the best." One which is repeated so often as to be rather tiresome is "Klein — aber mein"; and another good one takes the form, "Willst haben Gemach — bleib unter Deinem Dach." A Latin inscription, which has a strong flavor of convent composition, comes from Homburg: "Beatus ille homo — qui est in sua domo — et sedet post fornacem — et habet bonam pacem." From the Rhine comes a pious wish: "Des Herrn Segen sei im Haus — Unfried und Unglück bleib daraus"; and a pretty one from Switzerland: "Wo Fried und Einigkeit regiert — da wird das ganze Haus geziert." In the Altenburg district is another: "Des Hauses Schmuck ist Reinlichkeit — des Hauses Glück Zufriedenheit — des Hauses Segen Frömmigkeit"; and, from an undescribed source: "Herr, segne diese Friedenstatt — bis, wer drin wohnet, lebensatt — zu seiner letzten Ruhestatt — nur ein paar Bretter nöthig hat." It is curious that the gentle and pious inscriptions date mostly from within the last hundred years. Those remaining from an earlier period, of which there are many, reflect the coarse and rough manners of the age in which they were composed. In those days, apparently, the art of architectural criticism was extensively practised, for many of the inscriptions are addressed to the persons who are presumed to be making unfavorable observations on the building. One from Colmar, dating from 1330, says: "Ich bauen vir mich — sih du fir dich." Another, from Eckwersheim, near Strasburg, is even less polite: "Esel was guckst — guck vor dich." A third, also, from Colmar, but dating only from 1626, probably expresses the experience of the architect: "Eh veracht — als gemacht"; and the Town-hall at Wernigerode, built in 1492, still bears the words: "Einer achts — der andere verlachts — der dritte betrachts — was machts?" Later, it was not unusual to find the financial reflections of the proprietor, after the completion of the work, immortalized upon its walls in such sentences as this: "Wer will bauen — muss in den Beutel schauen," from the Rhine; or another, which is good enough to close with: "Willst du den Bau nicht weinen — bau nur mit eignen Steinen."

IT is a matter of some curiosity to see what are the requirements to be fulfilled in the erection of one of the club-houses which the student "corps" in the German universities, like our college societies, are beginning to erect for their own use. One of the first of these is the house of the corps "Teutonia," at Jena, which is described in the *Deutsche Bauzeitung* by its architect, Herr Hirsch. According to our ideas of German student societies, the most important room in the building would be the one devoted to duelling, but we discover none expressly designated in that way, so perhaps the sword-fights take place in some other building. If there is no duelling-room, however, there is a fine beer-room, or "kneipe," in the first story, with a "buffet" attached, and a game and reading room opening out of it. Beside the beer-room is a wardrobe for society costumes and insignia, and in the rear are the kitchen and janitor's room. The second story contains a large "fest-saal," or entertainment room, in front, with an ante-room and a ladies' dressing-room — a novelty in students' club-houses, we should imagine. The rear portion has a third story, which is devoted to bedrooms for members of the "corps" who wish to use them. The cellar is used for storage. The building was erected at the expense of former members of the corps.

THE Chicago *Evening Post* is responsible for the following story, of which our readers may believe as much as they please. According to this lively journal, Mr. Allen Greenough, a former resident in China, when in Chicago, on his way home to New York, mentioned a visit which he had paid to a "famous mandarin" at his summer residence on the banks of the Tsang River. One very hot day, the mandarin found his guest vainly trying to keep cool under the shade of a tree in the garden. He expressed his sympathy with his discomfort, and then told him that he would find a cooler place for him. Mr. Greenough followed him, somewhat unbelieving, to a little mound, in which was a door. The door opened into a tunnel, leading downward by an easy incline, and ending in a large and very cool room. "Through the top" of this apartment came "a flood of soft, golden light," which showed to advantage the furniture, "of delicately-woven bamboo-work." Wondering where the light came from, Mr. Greenough inspected the place more closely, and discovered that the walls and ceilings of the room were entirely of glass, and that outside the glass was the water of a little lake, which communicated with the river. It is not surprising that the guest expressed astonishment and pleasure at this novel apartment, and his host, smiling, "touched a button," whereupon "a hundred incandescent lamps, suspended outside the room at different altitudes in the water," came into action, and revealed "the beauties of subterranean life." "Fish of all kinds," by which, we suppose, is meant the subterranean kinds, "swam leisurely about, and beautiful sea-plants were growing luxuriantly." It may be imagined that an apartment at the bottom of a lake, from which "beautiful sea-plants" and subterranean fishes could be seen by merely touching a button, proved a most attractive resort for the American visitor, who, as he says, "spent more than half his time" there, and believes, with reason, that the most exquisite of the country-houses of his native land contains nothing so interesting.

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RELIGIOUS ARCHITECTURE.[1] — XI.

V. CHRISTIAN ARCHITECTURE. — THE BYZANTINE PERIOD.

SOMEWHAT later, toward the end of the fifth century, another modification was introduced at Constantinople and in Syria, and in the churches of the Orient, and it seems also certain that it found its way into the basilicas of Gaul. The transept was divided into three parts by two partition

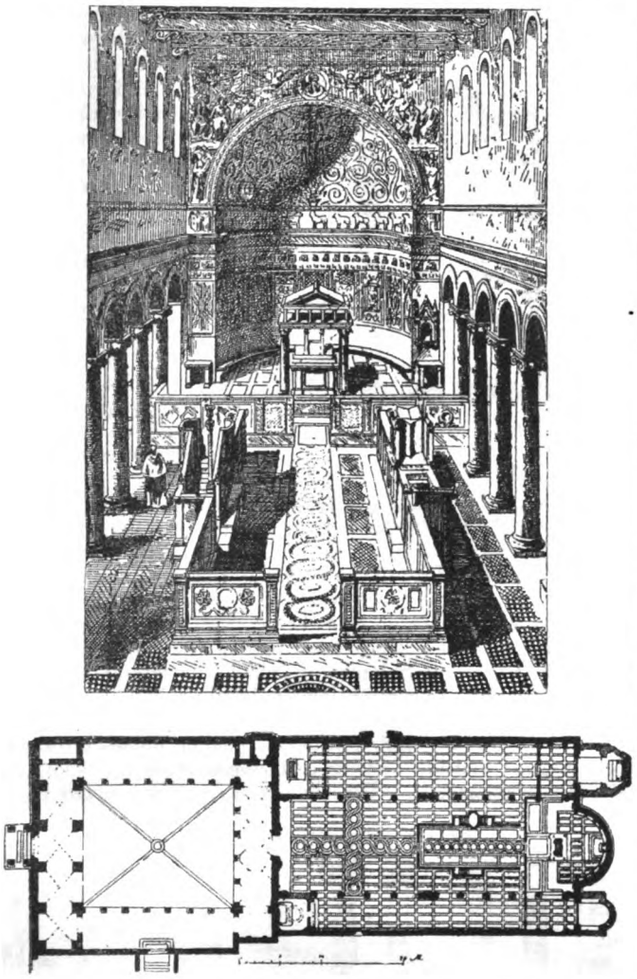

Fig. 9. Interior View and Plan of the Basilica of S. Clemente, at Rome (9th Century).

walls, prolonging the colonnades of the principal nave, and provided with broad, arched openings. The *altarium* thus became a square, isolated space, surrounded by four walls with arched openings. It was then possible to raise a roof above it. and, by making bays in the upper part, the light could be thrown full into the interior, on the holy place, whose position was indicated without, by a lofty tower rising directly over the altar. This tower, *turris*, or, as it was more generally termed, *domus aræ*, *domus altaris* (house of the altar), from which the word dome was afterward derived, was, in fact, a campanile; it was roofed with gilded wood, and comprised three stories of open arches.[2]

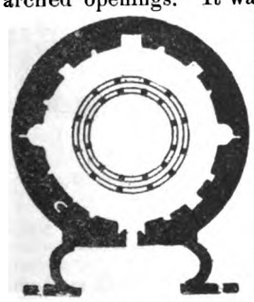

Fig. 10. Plan of S. Costanza, at Rome (4th Century).

With this modification in the form of the *altarium*, a change was effected in the destination of the apse; it soon became customary to erect a small monument in it, back of the altar, designed to receive the relics of a martyr; hence the name *martyrium*, which was applied later to the old *altarium*. Bays were then pierced in the circular wall of the apse to let a little light into this part of the structure, which had hitherto been lighted solely through the naves. It seems to be clearly established[3] that, from the sixth century, this new disposition led to the complete opening of the apse, which now merely rested on columns; the real enclosing wall was carried farther back, forming an apsidal gallery, such as is to be seen in the greater part of later churches. All these changes tended to the formation in front of the apse, which was itself gradually set farther and farther back, of a quadrangular space for the accommodation of the singers and inferior clergy, who had previously been relegated to the central nave; it was in this way that the choir originated.

From the sixth century, likewise, advantage was taken of the three-aisled arrangement in order to place the church under the protection of three different patrons. For this purpose it was necessary only to add a semicircular recess at the head of each lateral nave. The aisles became thus a repetition, on a reduced scale, of the central nave, and fulfilled the same functions.

A considerable number of subsidiary constructions were grouped around the main edifice. The *secretarium*, *vestiarium*, or *thesaurus*, for example, which became the sacristy, abutted against the rear wall or the apse itself. Often there were square cells, as at S. Clemente (Figure 9), at the head of the side aisles, where the supplementary apses were built later; sometimes there were genuine diminutive apses engrafted on the main apse, as at St. Felix of Nola.

From very early times, the outer sides of the aisles were flanked with chambers, exedræ, or oratories with small apses where the faithful could meditate in seclusion; these rooms communicated with the aisles through broad doors, and were the origin of our side chapels. They were often used for burials.

There were three or five doors in the principal façade, according to the number of naves, and each corresponded in importance to the interior division to which it gave access. In front there was a *narthex*, or porch, which was sometimes reduced to a mere awning, and sometimes formed an extensive portico closed at both extremities. The *narthex* was reserved for those persons who were not permitted to witness all the rites; it took the place, in this respect, of the space formerly devoted to them at the bottom of the main aisle.

These subsidiary dispositions were all subject to modifications, as, for example, in churches built after the plan of the Basilica Ulpia, in which there was a tribune at each extremity. In such cases the entrances were all on the sides. St. Vitalis and St. Agricola in Auvergne are constructed in this way. Other examples will be found in the Holy Sepulchre, at Aix la Chapelle, at Germigny les Prés, and so forth.

The pronaos was usually formed by the first bay of the naves, but it was sometimes a distinct transverse gallery, with colonnades. This disposition was oftenest adopted, when the aisles were of two stories, and it was necessary to establish communication between the upper galleries through a tribune above the pronaos.

There was a vast court or *atrium* in front of the church, which was frequently surrounded by triple or quadruple porticos; it became in time nothing more than a walled yard where the multitude of catechumens and penitents could remain, outside of the sacred edifice. In the centre stood the cantharus or bowl where the faithful performed their ablutions, symbolizing inner purification; a survival of this tradition is to be found to-day in the dispensing of holy water at the entrance to the churches.

After the sixth century, as most of the basilicas had come under various monastic communities, it became necessary to erect near them special buildings for the use of the brothers. These were built on one side; a court surrounded by cells was the disposition most naturally suggested to answer the new needs. As the *atrium* was daily declining in importance, owing to the great decrease of the number of catechumens in an almost wholly Christianized society, as well as to the adoption of less rigorous measures regarding the exclusion of penitents, the porticos of the *atrium* were converted into the courts or cloisters of the monastery.

Such was the usual type of the early churches, appropriated from existing antique models. But, as we have said, it was not the only type. The Romans frequently made use of the circular form for their great public halls, and we find imitations of these constructions among the earliest specimens of

[1] From the French of P. Planat, in Planat's "*Encyclopédie de l'Architecture et de la Construction.*" Continued from page 160, No. 755.

[2] J. Quicherat. "*Restitution de la Basilique de Saint-Martin de Tours.*"

[3] Examples: S. Severinus of Naples, S. Cosmas and S. Damian, in 526, and S. Maria Maggiore, from 440, according to Rossi.

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Christian architecture. The rotunda is sometimes simple, as in S. Pietro-e-Marcellino, at Rome, attributed to Constantine; and as in St. George at Salonica, which is probably of the same period; sometimes the rotunda is entirely surrounded by

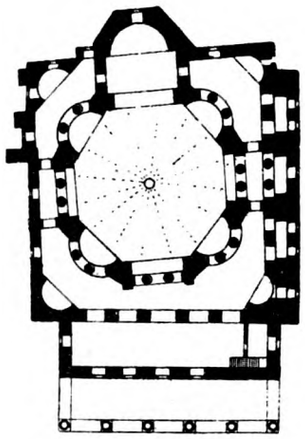

Fig. 11. Plan of the Church of SS. Sergius and Bacchus, at Constantinople (6th Century).

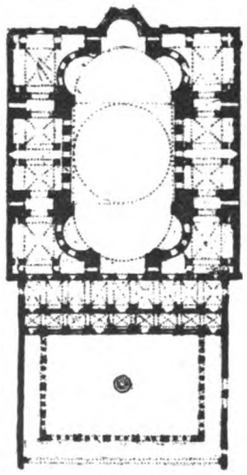

Fig. 12. Plan of St. Sophia, at Constantinople (6th Century).

a circular passage, as in S. Costanza (Figure 10) at Rome, and the Anastasis at Jerusalem, built by Constantine. The Roman prototype of this sort of structure may be seen in the rotunda of Nocera and in that on the Cœlian Hill at Rome — now S. Stefano Rotonda, but doubtless a market originally — and, in

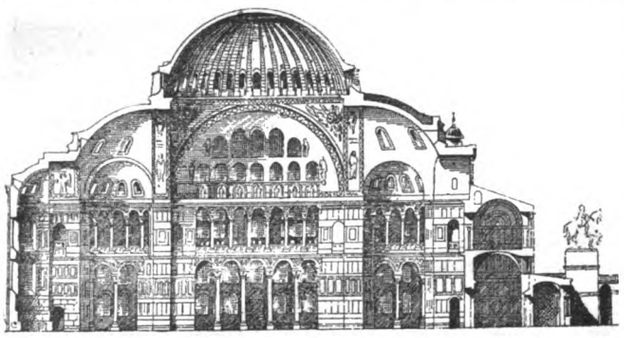

Fig. 13. Section of St. Sophia, at Constantinople.

general, in the great halls of the Thermæ. All these edifices were vaulted; in the annular rotundas, the circular passages were surmounted by one and sometimes two stories, above which were the openings lighting the lofty central nave.

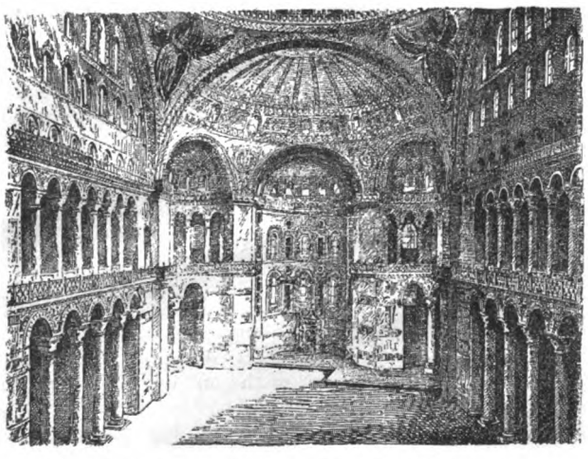

Fig. 14. Interior of St. Sophia (6th Century).

The baptistries were frequently constructed on the same plan, as the baptistry of St. John at Ravenna and that of S. Lorenzo at Milan show.

Among Byzantine churches, with a rotunda, we notice first the church of SS. Sergius and Bacchus (Figure 11), built at Constantinople, during the reign of Justinian; it has an octagonal cupola flanked by four niches, the axes of which are at an angle of 45° with the axes of the cupola itself. This disposition, completed by niches at the outer angles, establishes the transition between the central octagon and the square of the outer wall. In the later churches of St. Elias of Salonica (eleventh century) and St. Elias of Brusa (thirteenth century), the form of the cross is more sharply defined, but they nevertheless have all their parts symmetrically disposed around a central cupola, and may be referred to the circular type of churches.

The church of St. Sophia (Figures 12, 13, 14) was the first great religious edifice of the Eastern Empire; this original and peerless model of Byzantine architecture was begun in the year 532; it was dedicated a first time in 537, and again in 559. The architects were Anthemius of Tralles and Isodorus of Miletus. The basilical form was preserved, but a system of vaulting was introduced which presents new and most striking peculiarities. Over the centre of the principal nave rises a flat dome resting on pendentives; east and west of the dome-covered space abut semicircles with semi-domes, acting as supports to the main dome, the other sides of which are buttressed. With the exception of the foundation course of masonry and the course on which the principal dome rests, the whole structure seems to be of brick.

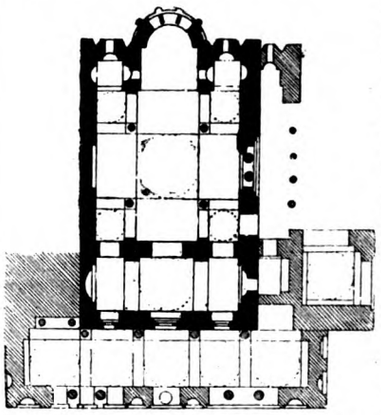

Fig. 15. Plan of the Theotokos, at Constantinople (9th Century).

Among edifices built in imitation of St. Sophia, we must rank St. Sophia of Salonica, in which the lateral half-domes are omitted and the central dome is boldly raised on arches.

The same general structure is also found at St. Nicholas in Myra, built in the sixth century. Smaller domes crown the four angles; and the *narthex* and *esonarthex* here assume considerable importance. The same type is perpetuated in the

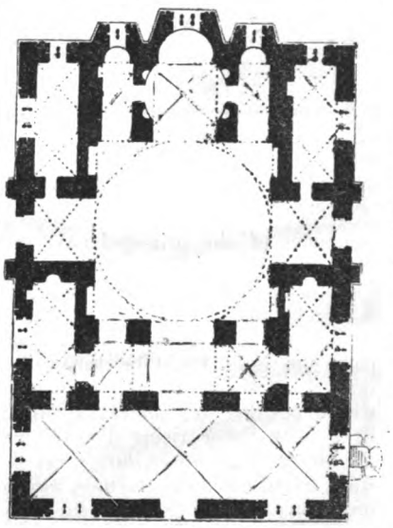

Fig. 16. Plan of the Church of the Monastery of Daphni, near Athens (9th Century).

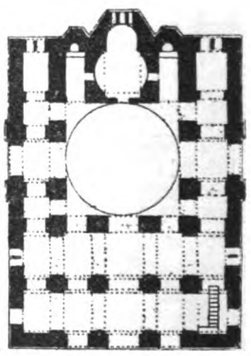

Fig. 17. Plan of St. Nicodemus, at Athens (9th Century).

churches of the Holy Apostles at Salonica (seventh century), and of the Mother of God, or the Theotokos (Figure 15), at Constantinople (ninth century), and of St. Bardias at Salonica; and also, notwithstanding secondary modifications, in the Byzantine churches of Greece; for example, the ancient Metropolitan church of Athens, the churches of St. Theodorus, Kapni Rarea and St. Taxiarchus at Athens, of Misitra and Samari in the Peloponnesus, of St. Nicodemus at Athens and of the monastery of Daphni (Figures 16, 17). The apses and aisles perhaps vary in form, but the characteristic principle of construction, to wit, a dome borne on pendentives recurs in all these examples.

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In connection with this characteristic feature of Byzantine architecture, especial study should be given to the method employed in the construction of the vault. It was usually built of small material, and in such fashion that centring could be nearly or quite dispensed with.

If we seek for the origin of the essential features of the Byzantine style, namely, domes borne on pendentives or squinches, and oblique joints making it possible to construct these vaults without centring, we shall evidently have to go back of the sixth century. Our researches will very probably lead into remote antiquity.

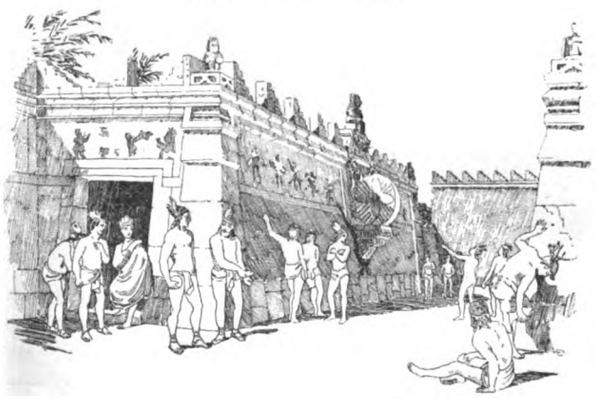
In the tomb of Placidia, of the fifth century, there is a cupola on pendentives.[1] In the cistern of the Thousand and one Columns at Constantinople, which is the reservoir built under Constantine, pendentives have also been discovered. The *Basilica* cistern of the fourth century, now Yéré Batan Seraï, the arch of Salonica, and the cupola of Diocletian's palace at Spalatro, exhibit the various forms of groined vaulting, spherical domes, and cupolas made wholly of small superincumbent squinches; we find in these early structures, then, the main features common in Byzantine architecture.

Going back to a far more remote period, it will be remembered that most of these constructional combinations were employed under the most varied forms by the Persians, and earlier still by the Assyrians. It may then naturally be assumed that the traditions which took birth on Asiatic soil were perpetuated from century to century, and generation to generation, until the day when, after the establishment of the Eastern Empire, the Romans permitted their own traditions to be influenced by those of Asia. It was the alliance of these types that produced the Byzantine style of architecture.

As for the mode of constructing vaults without centring, by means of inclined joints, it may have originated in Egypt, where it may have been learned by the Assyrians, as the two countries were in intimate intercourse with each other. It is an unquestioned fact that the vaults of the Ramesseum, built thus of crude brick, date from the nineteenth dynasty.

[To be continued.]

ART IN MEXICO.



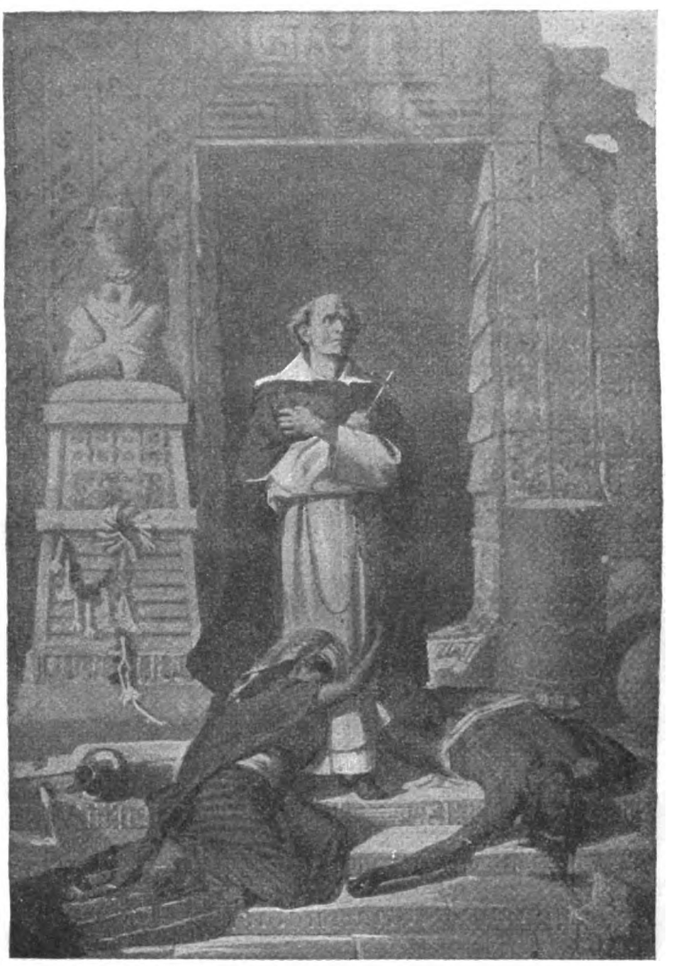
The Game of *Pelota* among the Ancient Mexicans. By Ibarraran.

WHILE the unexpected discovery of a Titian in the decaying church of an obscure Indian pueblo of Mexico is attracting the attention of the art-loving world, some information regarding the progress of indigenous art in Mexico will not come amiss, and is likely to occasion as much surprise as did the news of the Titian discovery.

The existence of a National Academy of Fine Arts in the capital of Mexico naturally suggests that Mexican art has not only an existence but a history. It likewise suggests that its history may be best reviewed from the standpoint of the Academy. But one does not pursue one's investigations of the subject very far before encountering the statement, so often made as to become a sort of proverb, that "Mexican art received its death-blow when the Academy of Fine Arts was established." The walls of the Academy seem at first to furnish abundant verification of this statement. Closer study, however, reveals the facts that the causes of the decadence of the Mexican art which flourished in the latter part of the sixteenth and early part of the succeeding century, are not to be sought in the foundation of the Academy something over a hundred years ago; that Mexican art was dead when the Academy was founded, and that the failure of the Academy to restore it to life was principally due to the political convulsions prevailing in the country for nearly the entire century in which the Academy has had its existence.

The history of the Academy is easily related. In 1779 the principal engraver of the mint in the city of Mexico, with the permission of the Emperor Carlos III, opened a school of engraving. So much interest was manifested therein that the director of the mint proposed to the Spanish Viceroy of Mexico that a school be established for instruction in painting, sculpture and architecture, and in 1781, with viceregal approval, classes in these arts were organized. At the same time plans for the founding of a school of art upon a larger scale, were submitted to the Emperor. Among the many benefactions bestowed upon Mexico by Carlos III, "one of the greatest and wisest of the monarchs of Spain," and which the Mexicans acknowledge with gratitude, was the San Carlos Academy of Fine Arts of New Spain (*La Academia de las Nobles Artes de San Carlos de la Nueva España*), founded by royal order dated on Christmas day, 1783. Two years later the formal opening of the Academy took place upon the arrival from Spain of its two professors, Aguirre, a painter, and Velasquez, a painter and architect.

In 1791 the Academy removed from the mint where there had been scanty room for its classes, into the building it occupies, previously



Las Casas defending the Indians. By Parra.

a hospital. Carlos IV upon his accession to the Spanish throne continued the interest his predecessor had manifested in the Mexican Academy, and sent thither a collection of casts from the antique, valued at $40,000, and two new instructors, the painter Rafael Jimeno, and the sculptor and architect, Manuel Tolsa.

But the clouds of war shortly afterwards appeared upon the horizon. During the long struggle which ended in 1821 in the independence of Mexico, the Academy exhausted its endowment and was forced to close its doors. It was upon a small appropriation derived from the municipal treasury that it opened again in 1824 and continued open until 1843. In that year it was authorized by the national government to receive the proceeds of an annual lottery (always a fruitful source of revenue in Mexico) for the purpose of purchasing, enlarging and otherwise improving the building previously rented for academical purposes. But the war with the United States delayed the completion of these arrangements until 1847. The next two decades were filled with civil wars, which brought further disasters to the Academy and it was not until 1868, after the restoration of the Republic upon the fall of the Maximilian Empire, that the government was in a position to become the useful patron of this wisely conceived institution. By an annual subsidy of $35,000, the Academy was placed in easy circumstances. It was furthermore enriched by the government with some of the art treasures looted from the churches and monasteries of the capital in the execution of the infamous decree issued by Juarez in 1859, nationalizing church

[1] Choisy. "*L'art de bâtir chez les Byzantins.*"

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property. The name of the institution was officially changed to the National School of Fine Arts (*Escuela Nacional de Bellas Artes*), but it is still popularly known as the San Carlos Academy.

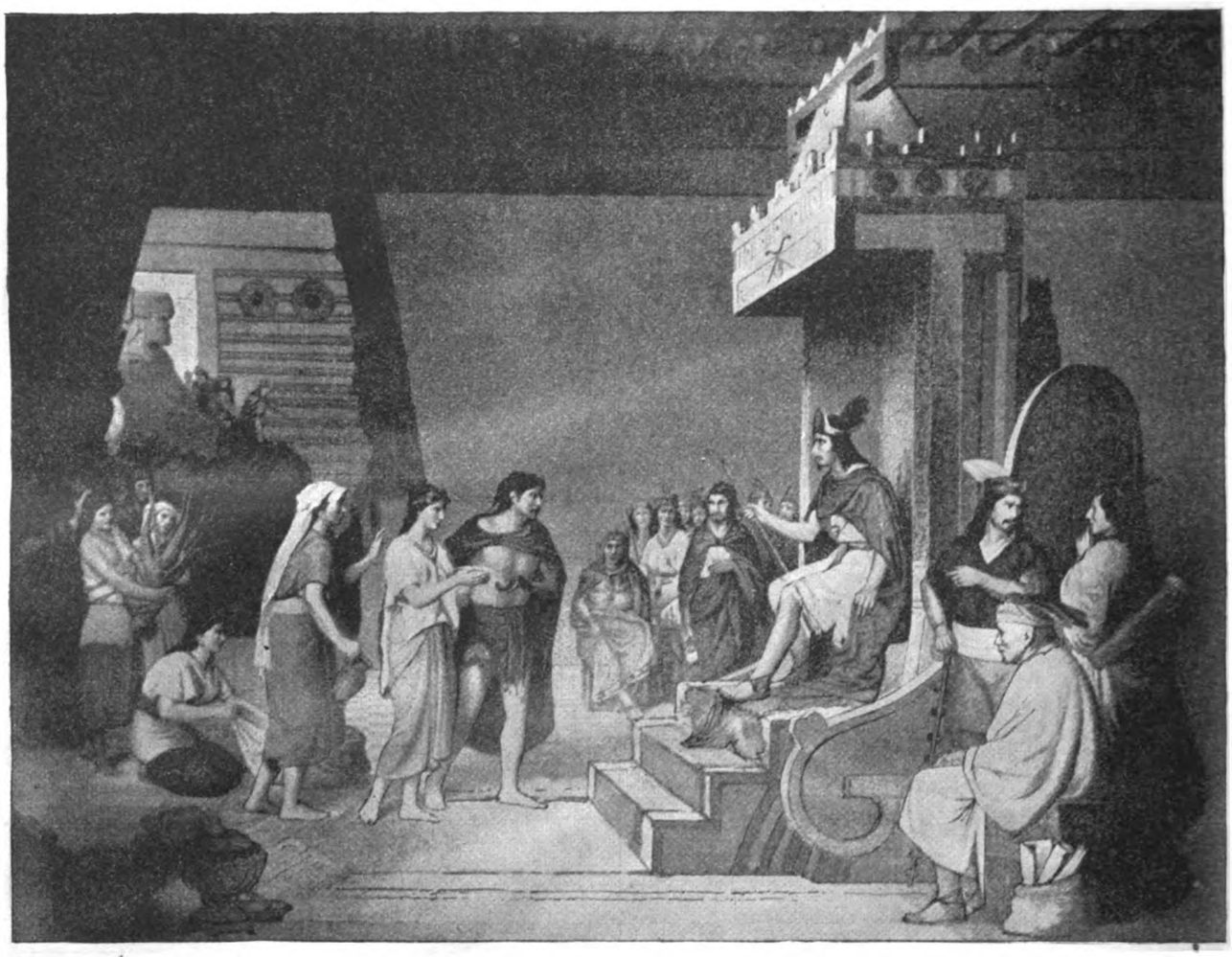
In the first and second rooms of the Academy, are exhibited many examples of Mexican art in the sixteenth and seventeenth centuries, and these are pointed out as illustrating the high estate whence Mexican art fell upon the founding of the Academy. We have seen, in the history of the Academy, that it is even now too early to look for the results of that institution, and the merest glance at the pictures in the first and second rooms suffices to show that art began to decline as soon as it was transplanted to Mexico, and was practically extinct half a century before the Academy began its precarious existence.

In reviewing the earliest art history of Mexico we may find reason enough for its decline and final extinction in the removal of the peculiar circumstances which gave it prosperity at first. The earliest missionaries to New Spain cultivated the arts among the Indians. Among the schools established by the Franciscans in the city of Mexico before the year 1540 was a school for the musical education of the Indians at Tlatelolco and one for teaching drawing. Later in the same century there came from Spain, four artists — fresh from the influences of Spagnoletto, and the Caracci, their contemporaries — trained in the Renaissance period nearly at its best. They were Sebastian Arteaga (architect as well as painter), Alonzo Vasquez, Baltazar Echave and a woman known as La Sumaya, said to have been the wife and teacher of Echave.

There was plenty for these to do. Magnificent churches were being built in all the cities of New Spain and these painters were employed to paint religious pictures for them. Up to the time of the confiscation of church property under the so-called "Reform," many of the works of these apostles of art in New Spain were to be found in the churches and monasteries of the capital and other large cities. Some of them may still be seen in the cathedrals of the capital and Puebla. Some of them were doubtless destroyed in the ruthless pillage that went on in obedience to the decree of "nationalization" — for soldiers are not usually discriminating art critics, and the Mexican soldiers are less than usually so. But some of them were bestowed by the national government — always munificent with what it comes by dishonestly — upon the Academy and may be seen in the first room. They display breadth, vigor, refinement of sentiment, fondness for rich details, — the glitter of plate and delicate textile fabrics. Echave was the best of this earliest group of painters and was an exquisite colorist. Of the earlier painters of the seventeenth century (Herrera, Andreas Lopez, Aguilera, three by the name of Rodriguez, and four of the name of Juarez) Louis Juarez possessed some of the spirit of the earlier school; and there was also a younger Echave who inherited some of the talents of his father and perhaps his mother.

Later in the seventeenth century a new influence had its rise under Cabrera and Ibarra. Cabrera was the better of the two. He was a Zapoteca Indian, born in Oaxaca, and the school was largely composed of natives. The best of his pupils was Vallejo. Juan Correa was one of the most industrious of this school if we may judge by the number of his works now extant. Like their predecessors the artists of this school confined themselves almost exclusively to religious subjects and found the church their most generous patron. Some of them lived on into the eighteenth century, but when they died, Mexican art died. There was but one artist belonging distinctly to the eighteenth century to demand our attention, and he was removed by two hundred miles and more from the art influences of the capital. The life of Francisco Eduardo Tresguerras was spent in his native town, Celaya, and one must look there for the evidences of his genius. From his devotion to the three arts, architecture, painting and sculpture, he is known as the "Michael Angelo of Mexico." He was more of an architect than a painter, and one of his churches, Our Lady of Carmen, in Celaya, is quite famous throughout the country. It contains some of his frescos and a painting of the patroness of the church. Some of his paintings are in the hands of private parties. He died in 1833.

The second room at the Academy illustrates the decline of art in the seventeenth century, and prepares the visitor for its total suspension in the eighteenth. In the third room are exhibited pictures by European artists, the plunder from the churches and monasteries. There are examples of Murillo, Rubens, Leonardo (the Spanish



The Discovery of Pulque. By Obregon.

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Leonardo, not da Vinci), Van Dyke, Ribera (Spagnoletto), Andreas Vaccara, Carreño, Guido, Coghetti, Zurbaran, perhaps Teniers the elder, Rembrandt and Ingres.

It is in the fourth and fifth rooms of the Academy that the visitor must look to see the actual result of the institution which has been charged with the death of Mexican art. It must be admitted that the fourth room contains little that is promising. The most notable of the paintings displayed there is the "St. Charles Borromeo," which won for its painter, Salome Pina, the pension of $600 a year for six years, to enable him to pursue his studies in Rome — the highest of the prizes given for meritorious work at the biennial exhibitions. The display in the fourth room is not disappointing, simply because the visitor has no right to expect more than is to be seen there, after having reviewed the difficulties under which the Academy has finally won its firm establishment. The fifth room, however, may well occasion some surprise to the visitor. It gives undoubted evidence of a Renaissance in Mexico. The Mexican artist of to-day has started to beat out a new path for himself. He finds his principal motive in the traditions of his race, for among the artists of the present day in Mexico there are some in whom the Indian blood is pure, while it predominates in all of them. Such a painting as "The Game of *Pelota*" may be purely of archæological interest, and wholly lacking in artistic merit (it certainly is faulty as to its perspective); such paintings as "The Discovery of Pulque," "The Gladiatorial Combat of the Aztecs" and "Montezuma on his Way to meet Cortés" may commit their respective painters to errors in history, and theories of the existence of an Aztec Empire and an exaggerated state of civilization which must be sooner or later exploded, but they show that Mexican art is likely to develop upon lines peculiarly its own; that the picturesque element of the remote past in Mexico is appreciated, and furnishes an abundance of themes for the artist, as well as the *savant*, the historian, the poet and the novelist. Better pictures there are in the fifth room of the Academy than these archæological paintings; indeed, the fourth room exhibits some work in which more artistic skill is displayed. Carasco's "Job," Luis Monroy's "Caridad Romano," Pelegrin Clave's "Juana la Loca," Obregon's "Giotto" and Parra's "Galileo" are paintings that would command attention in any gallery; but the others seem more properly to denote the trend of Mexican art, to indicate most clearly what its future is to be.

The most notable specimen of Mexican art deserves mention by itself. It is the large canvas, by Felix Parra, of "Las Casas defending the Indians," an attempt to picture the noble character of Bartolomeo de las Casas, Bishop of Chiapas in the sixteenth century, who spent the best years of his long life in trying to relieve the Indians of the New World from the burdens of an oppressive slavery laid upon them by the Spanish conquerors. The noble subject is grandly, yet simply treated, the coloring strong, yet subdued, and the picture is deserving of attention among the great pictures of the world. It was exhibited at the Exposition in New Orleans in 1885, and attracted much attention, though few who saw it knew the history of Las Casas. It is especially entitled to consideration as illustrative of the indigenous art of Mexico, for it was painted before Parra had seen any land but his own. Happily, one does not have to know this in order to appreciate his work, and it is not here mentioned by way of apology for any lack of excellence in it. It is not too much to say that the painting would be creditable to any artist now living. It gained for Parra the Roman prize, and he has since been abroad pursuing his studies.

Sculpture has scarcely any history in Mexico, though the capital and many of the provincial towns possess works of unquestioned merit. The seventeenth century produced an Indian sculptor, Patiño Instolinque by name, and José Villegas Cora, a Pueblano, whose work is best displayed in the Cathedral and other churches of his native city. Tolsa's great work is the magnificent Carlos IV equestrian statue. But the masterpiece of sculpture in Mexico is the noble tomb of Juarez in the Panteon de San Fernando. It is the work of Indians, the brothers Islas.[1]

Since Mexico ceased to build churches, the field for original designs in architecture has been extremely limited. In the handsomest buildings now existing in the capital, Tolsa's work is seen. In other cities of the Republic, local sculptors, local architects and local painters are displayed through their works. Isolation has, of course, placed many limitations upon the work of such. Yet it is surprising to find some of them exhibiting positive merit. Gabriel Barranco, of Orizaba, admirably illustrates this. "This man's work is not an echo, but a continued embodiment of the art-feeling of Italy and Germany (even more than of Spain) of three centuries ago, and under conditions of isolation identical with those under which lived and worked a very large number of the minor artists of that time."

There is an Academy of Fine Arts in Puebla, but it has not thus far exerted any marked influence upon Mexican art. The *Escuela de Artes* of Guadalajara is a manual training-school, and, though sometimes mentioned as indicating a widespread interest in art, is not properly entitled to mention here. Similar institutions exist at the capital, in Puebla and in other large cities of the Republic.

Art has received little patronage in Mexico of late years outside of the Academy. The church has been oppressed and robbed, and, if now in the possession of wealth, is cautious about displaying it. Furthermore, the modern artist, influenced, no doubt, by the prevailing religious indifferentism of Mexico, does not do much in religious work. The government has been involved in wars and debts ever since the national existence of Mexico began, in 1821. It has, nevertheless, been reasonably liberal in its purchases of the portraits of national celebrities and of historical paintings. The Academy has encouraged its members by purchasing the works which now adorn its walls. There are no private galleries in Mexico. The country has been so demoralized by revolutions that the people have had neither opportunity nor inclination to possess themselves of works of art. Now that political affairs give promise of greater stability, and as the pride manifested in the work already accomplished by the members of the Academy becomes more widespread, some of the wealth of Mexico will be devoted to the encouragement of native talent. If this be so, we shall see something within a few years that will strengthen our faith in the promises now made by the indigenous art of Mexico.

ARTHUR HOWARD NOLL.

[1] See *American Architect*, April 9, 1887, No. 589.

THE SITES PROPOSED FOR THE WORLD'S FAIR. — THE GREAT TOWER. — THE NEW WISCONSIN CENTRAL RAILWAY STATION.

IN spite of the malicious and mendacious remarks of the New York papers to the contrary, the World's Fair committees are working most harmoniously and successfully, accomplishing all that could be expected in so vast an undertaking, and so short a space of time. It is hardly just to look for results yet (except it might be among people so famed for push and energy as the New Yorkers), and that the different departments have already gotten their work well systematized is a proof that much is being accomplished. The general outlines are now ready, and only await the final ratification by the National Commissioners.

The site is still the all-important topic of general interest. Lovers of peace and quiet in the city insist that by locating the Fair in the heart of the town on the Lake Front, a grand fiasco will be provided for. This "Lake Front" is the name given to the narrow strip of land which for about a dozen blocks in the heart of the city runs between Michigan Avenue and the Lake, the Lake side being fringed by a dozen or so railroad tracks. There have been numerous plans suggested for utilizing it, but all of them necessitate the sinking of the tracks, and an immense amount of piling and filling in the Lake. Moreover, the title is extremely uncertain, the United States Government, the city government and the railroads each claiming portions of it.

Those who are opposed to this site assert that to begin with there is not enough space for the purpose, California alone wanting eleven acres. They maintain it is absurd to talk of utilizing the inner harbor, first, because the expense of driving piles would be so immense; secondly, with piles driven into it for so many years, the harbor would be most probably ruined by the sand which would lodge around them; and thirdly, that the draining of this immense institution directly into the Lake would be a serious source of sanitary danger. Finally, those not favoring this site claim that having the Fair in the heart of the city would so crowd the streets that business would be practically at a standstill, and ease and comfort would be a thing unknown on the down-town thoroughfares during the six months of the Exposition.

These arguments are all as nought to the people who believe in using this same Lake Front for a site. They assert there is more space on the present land than has ever been used by any world's exposition heretofore, and if certain States want all "out-doors" for their exhibit, let the agricultural part be separated, and put out on the limitless prairies, west of the city. They maintain that, financially, the Fair will be a total failure if removed from the heart of the city, because of the inconvenience of reaching it; that by its being held down town people will be enabled to drop in for an hour at a time, and instead of crowding the streets it will have an exactly opposite effect; so many more people would visit the Fair, that just so many would be removed from the streets. In fact, there are such a number of ways of looking at the same object, that one begins to wonder whether there is such a thing as mental strabismus.

The site most in favor at present is Jackson Park. It is at the south of the city on the Lake Shore, and could be reached by half-a-dozen railways, as well as by Lake, which, in the summer, would make a most agreeable variety in the mode of travel. The Park is only about twenty minutes' distance by rail from the heart of the city, and is most pleasantly situated on the shore of Lake Michigan, and contains acres enough to enable the entire exhibition to be in one place, and not scattered around generally, so that the

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thing one most wanted to see would be in the "other place." Being on the Lake, the site would be much more desirable than any of the limitless tracts on the West Side of the city in point of temperature, as the thermometer on the shore is usually eight or ten degrees lower in summer than on the West Side. So, unless Chicagoians want to sully the fair fame of their city as a "summer resort," it would be unwise to choose the hottest place within its limits for a summer show.

The wildest schemes for attractions within the grounds are being constantly advocated by patriotic citizens, not numbered among the committees. Hanging gardens that would force those of ancient Babylon from their former exalted place in history, have been boldly claimed to be a desirable feature, and, in fact, should many of these schemes be worked out, magic carpets, Aladdin lamps and most of the shining lamps of the Arabian Nights, would have no more effect on us who might have the good fortune to view the Fair, than a small tallow dip would have on a person who has spent his entire evenings under a thirty-two candle incandescent burner.

One of the plans which seems to be formed less of "such stuff that dreams are made of," is that for erecting a mammoth tower. Papers of incorporation have already been taken out under the title of "Columbian Tower Company," and the idea is to erect the work in the midst of the city proper, outside of the Fair grounds, and having no connection with its management, being an entirely private enterprise backed by capital from the East. Over two millions will probably be expended. Plans have been prepared by Washington architects, one of whom was connected with the designing of the main exhibition building at Philadelphia in 1876. The idea is to build a tower which shall throw that of M. Eiffel in the shade, and when one thinks how persistently the summit of that one must have basked in the sunlight, the undertaking seems rather a large one.

Rumor has it that the tower will be fifteen hundred feet high, with a diameter at the base of four hundred and eighty feet, being of steel lattice-work. How mortifying it must be to those builders of old, who gathered around the famous Babel, if they can look down on such achievements, and accomplished, too, without the aid of Volupuekt. However, from the information given to the public, the drawings have evidently not been very carefully studied in connection with any exact location, since in the portion of the city mentioned there is no block large enough for this construction.

The main entrance will be eighty feet wide. The four main entrance pavilion's porticos will lead through large lobbies to a dome or cupola in the centre of the tower, two hundred and thirty-seven feet in diameter by two hundred feet in height. This dome will be used for a music hall, which will be the largest in the world, having a floor space with galleries and lobbies for over thirty thousand people. There will also be in this gigantic structure, room for the largest hotel in the world, a hotel with over five thousand rooms. It is also planned to obtain space to offer to the Public Library and other public institutions. The scheme is to have eight elevators for the first hundred feet, four to two hundred feet, four to four hundred, and two to the top of the building. With the present atmosphere of our city what will expected to be seen from the dizzy height of the summit, remains to be explained. Of course, one could look over into the smoke-free fields of Michigan, Wisconsin and Indiana, perhaps, and as for the matter at the base, it may be interesting to view the wrong side of a smoke-cloud.

The globe at the top will be thirty-eight feet in diameter and lighted by sixteen electric lights which can be seen at a distance of over fifty miles. The outside balconies are to be lighted with electric lights with colored globes. It is said over fifteen hundred will be used.

The originators expect the tower will pay for itself in the first three months of the Fair, and after the close of the exhibition it is expected that a fair return will be made in rents, fees, etc.

All these castles in the air are offset by a scheme for doing equally wonderful things below the surface of the earth.

Here comes a man from Colorado and declares that the one and only thing that will make the Fair a success is to have a mine seven hundred feet in circumference excavated under the city, five hundred feet below the surface. As no external decoration is necessary all will be lavished on the interior, and the marble halls that people occasionally dream of are going to be as an humble cot compared to this. Lined with marble and iron will be the corridors, though what will be their use has not yet been stated.

At least, the visitors to our city in 1893, who arrive *via* the Wisconsin Central Railway, will receive a good first impression of the place in the fine new station of that road. The building has been under contemplation for several years and is now nearing completion. It is built of a very dark shade of pressed brick, the distinguishing feature of the exterior being a fine tower modelled on Giotto's Campanille. A somewhat curious minor feature of the exterior is the small mediæval turrets with their oylets, not entirely in keeping with the style of the tower or with the fine large round-arch openings for the windows, and the entrances for the drive-ways of wagons, carriages, omnibuses, etc.

The passenger-shed contains six tracks, giving a width to that part of the building which makes the centred arch of the opening particularly impressive. The roof is glass and iron, the construction of the iron being as light as possible, giving the full extent of glass to the given space.

Though the papers take a most optimistic view of the relation between the different parties of the recent carpenter's strike, it is quite evident that the trouble is by no means settled. The old bosses still refuse to hire Union men and as the outstanding jobs are being finished up, these men find themselves out of work. They consequently devote a good deal of their time in threatening acts of violence to the non-Union carpenters employed, attempting to intimidate them, and in prosecuting the bosses under the alien contract law, for bringing in men from Canada.

CANADA

THE PARLIAMENT BUILDINGS COMPETITION. — THE TORONTO BOARD OF TRADE BUILDING. — THE STRIKES IN THE BUILDING TRADES.

IN writing of the doings of American architects who have been fortunate enough to secure commissions for buildings in Canada, and in describing these buildings, I have sometimes been accused of spitefulness towards them, because they are Americans and I am an inhabitant of Canada, and, perhaps, on this account it may be difficult for readers of these letters to judge fairly of what I write, or to interpret correctly the spirit in which I write. I do not deny for a moment that I am filled with a strong animosity to those public boards and private individuals who deliberately pass over Canadian architects and give their best works to Americans, but if the Americans who get the works are in the honorable practice of their profession, and are "architects," in reality, it's not *their* fault so much, and they are rather to be condoled with, because they have not been able to see that there is anything contrary to professional ethics in stepping over the border. Fortunately, I have not to condole with very many of them, but, at the present time, are we not all jealous of the honor of the profession and letting alone nationality, every one ought to be free to expose fraud and incapacity when it acts to the injury of the profession at large, without immediately being charged with the petty jealousy of a narrow mind.

The Province of Ontario is about to experience the excitement of an election for its Parliament, and the liberal Government does not vacate the chair with the cleanest of hands; whether it will succeed in washing its hands sufficiently clean as it stumps the country seeking re-election, so that it will be allowed another term of service, is neither here nor there to architects outside the Province, but to those in it, it is a matter of some import. The profession has had a good deal to do lately with this outgoing Government, and looks to the result of the elections with considerable interest. In the first place, that which has brought it into immediate connection with the Government has, of course, been the Ontario Architects' Act, of which an epitome was given last month, and possibly the profession would not be sorry to see the Liberals take up the reins again, because, although they have not much to thank the Government for as regards their bill, yet the Government has found out that the architects are capable of exerting themselves with results, that, to say the least, are not soothing to its pillow, and will require some conciliation. Whereas if the other party, the Conservatives, are returned to power, they know they will have little to expect from the leader, who in the past session, opposed their Act of Registration from the start. It is over the Parliament Buildings "job" that the profession has made itself felt. One of the Toronto dailies has been publishing the whole case of the transactions — which have been mentioned before in these letters — which no one attempts to disprove, and which the electioneering agents of the Government only attempt to combat by direct denial. The Government has issued a pamphlet for the guidance of its stump orators, in which it states that Mr. Waite, of Buffalo, "*secured the appointment* (as architect) *after a fair competition, expert judges deciding that his plans were the best.*" The fact is, Mr. Waite was called in as an "expert adviser," that he condemned all the designs sent in, and being entrusted with the two best designs in order to report upon them, he kept them for eight or nine months before handing in his report upon them. No one has ever seen that report, and it is believed that there never was one, for this much is certain, that while the competing firms were waiting to hear the result of the expert's examination in favor of one of them, they discovered that the Government had decided not to use either of the designs, *but had given the commission to Mr. Waite.*

Of the two designs, working-drawings were prepared, that tenders might be obtained upon both of them. One came out at $542,000, the other at $612,000. Thereupon the Government obtained a grant of $750,000 which was to be final. Now that Mr. Waite's designs are being carried out, it has been found that the $750,000 have been swallowed up by the masonry and brickwork alone. It is estimated that to complete it will cost at least $2,000,000, and the Premier of the Provincial Government, now stepping down, says himself,

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"he does not know what it will ultimately cost." The Toronto *World* has published a sheet giving illustrations of the designs of Messrs. Darling & Curry, and of Mr. Waite, and there are hardly two opinions as to which is the most beautiful and suitable building, the one to cost not more than $750,000, the other to cost certainly not less than $2,000,000. Were they both estimated to cost the same sum, the Buffalo architect's design cannot but be looked upon as wanting in dignity and as weak in conception, by the least instructed of the public; but in addition to that comes the fact that his design is costing three times the amount of the other. Then, again, it must not be forgotten that this is not Mr. Waite's original accepted design, but a second one — the first, after its execution had been begun, proving altogether unsuitable — he was allowed to re-design the main front.

The other painful matter, in which men practising as architects have failed to uphold the dignity of the profession or preserve it from suspicion, is the Toronto Board of Trade Building. But, while mentioning these facts, let it be observed, for the satisfaction of architects practising on this continent of America, that the "architects" of the Board of Trade Building are not Americans nor Canadians, although practising in the States. The history of the competition, and the strange report of the expert appointed to decide upon the merits of the designs, which proved that the Board of Trade had, contrary to their stipulations, opened the envelopes and discovered the authors of the designs, has already been given. The clauses of conditions contained a regulation that would save them from the employment of incompetent men, but they never seem to have made any inquiries as to the ability of the men to whom they entrusted the work. Now, however, the mystery surrounding the actions of the Board and the secrecy of their deliberations concerning which I gave quotations two months ago from the *Mail*, is all accounted for — the building has been examined and proved to be absolutely insecure. The absolute ignorance displayed in the simplest parts of construction is astonishing; weight of superstructure seems never to have been calculated, the terrific cracks, the downfall of part of the work and the iron props with which attempts have been made to bolster up the building, prove a very lamentable fact. The architects dismissed the contractor, and possibly some blame rests upon him, but now the Board of Trade have taken the work out of the hands of their architects and secured the services of some one else to repair the damage done, and complete the building.

I do not know upon whose authority the papers give the information, but they state that the Board must spend $50,000 to make good the harm done. The total cost of the building was estimated at about $250,000, and it was to have been ready for occupation by the autumn.

The architects of the Province of Quebec have appointed a committee to draft by-laws and draw up a constitution with the object of forming a Quebec Association. It really looks this time as if they meant business, although the half-dozen attempts that have been made to bring the members of the profession together in Montreal during the last twenty years, all failed.

The letter from their secretary that appeared after my mention of their "racial" dislikes, goes to show that there was no such thing, but, I see by the names of the committee that some of those gentlemen who formerly acknowledged the possession of such feelings, have been converted. The profession in other places wishes them every success, and that they may be able to obtain more satisfactory legislation than has yet been obtained in Ontario.

The strike in the principal building trades which has been in progress for the last two months in Toronto has just been brought to a close, with practically a victory for the workingmen. The stone-cutters, who asked for an increase of 7 cents an hour, have compromised at 5 cents, making their wages now 43 cents an hour; and the bricklayers, who were getting 33½ cents an hour, and demanded 36 cents, have agreed to a five years' contract: 35 cents an hour for the first year, and 36 cents for the remaining four years. Whether the master-builders have been wise in coming to this settlement is a question. I believe it is the greatest mistake. The result is due to the efforts of the President of the Board of Trade, who has succeeded where the Mayor of the city failed even to get a hearing. It was the prevailing idea that the stone-masons must give in very soon for want of funds. However, they held out just long enough, and have been rewarded. A large number of men in these trades have left the city, so there will be no difficulty for those who remain to get work. The amusing thing about these strikes is the utter indifference of the public generally and those individuals who are having buildings erected for them. They quietly sit by and take no interest in the proceedings, while the men refuse to work and the masters refuse to increase their pay, and then, when both masters and men are tired of the ridiculous position in which they have been standing, they (the public) submit without a word, like the most docile of sheep, to be fleeced by the men, with the approval of the masters. When will the public learn that it is for them to say to the men: "We are paying you fair wages, and we will not add a cent." Now the public lets the Union tyrannize over the masters without an attempt to back them up, and, the strike being settled, the proprietors are content to go their ways in peace, and hardly comprehend that they have been, in reality, far more fooled than the masters. Our master-builders had better change their name if this kind of thing is to go on. The men are the masters, and they know it; but their day of reckoning is not far off. They have had almost enough rope, and the result is inevitable, although it is delayed. Let them strike, let them ask a dollar an hour, or five, for that matter — anything to rouse the lamb-like public! Where is the spirit of the proprietors who now submit so innocently to be sat upon?

Comparing the standard of wages in the various States, 36 cents for a bricklayer is not high, but where wages are higher it is because expenses are higher: house-rent, food, clothing — all are dearer. This fact, however, the wire-pullers of the Unions say nothing about. They exhibit a table of wages in various parts of the States where living is dearest, and say to the men: "See, you poor devils, what wages are paid in the States, while you've been content with about two-thirds of these amounts." So the men are fooled by the Unions, the masters are fooled by the men, the public are fooled by all three, and seem to enjoy it hugely.

Judging from the contents of this letter, one would say it is an era of fooling. First of all, some architects get fooled, through, however, no fault of their own; then the Ontario Government, by the Premier's "pet architect." The Board of Trade get fooled by their own precious astuteness in their choice of a professional adviser; the public get fooled by the strikers, and last, but not least, just as I am about to close this for the post, I find the architects of Ontario, who were fooled over their Act of Registration, are fooled again by the return to power of the government that was (had their wishes been carried out) to have stepped down.

RAINS AND FLOODS. — THE PROSPECTS OF COLONIAL ARCHITECTURE. — THE SEAL OF THE ROYAL VICTORIAN INSTITUTE OF ARCHITECTS. — A HUGE GRAVING-DOCK.

SYDNEY, N. S. W.

AFTER almost nine months of persistent and tremendously heavy rains, and the concomitant mental and commercial depression, we are enjoying pleasant sunshine once again, and welcoming the return of a more prosperous time. The rains, however, have wrought serious damage. At Bourke, a town of considerable size on the extreme northwestern boundary of New South Wales, where the flood-waters caused the River Darling to rise nearly fifty feet above the summer level, it was found necessary to erect a gigantic dam to keep the water back, but it proved of little use. The river rose rapidly inch by inch, until in a few days a wall of water ten feet high encircled the doomed town; for despite the heroic efforts made to prevent it, the flood, after a little while, obtained the mastery. Finding a weak spot in the embankment, it soon made a passage for itself, and, gaining headway, swept over ill-fated Bourke and the surrounding plains, till it formed a shallow inland sea. No lives were lost, fortunately, as the inhabitants had time to save themselves, but the town is ruined; so that, ill as this wind has been for some, it may still blow a few good commissions across the architect's path. This is, perhaps, a very natural and, therefore, very selfish way of looking at a national disaster.

The good time we have waited so long for, and whose coming has been so long delayed, would seem to have arrived at last. Private work seems to have received a fresh, strong impetus; there are competitions advertised for two large arcades, which are to cost £120,000 between them, and there is building everywhere. We have also seen the inglorious death of that effete institution, the Colonial Architects' Department, and in future all important public buildings will be thrown open to competition. In Victoria, too, and the neighboring colonies, the architectural prospect is brightening.

The Royal Victorian Institute of Architects, by the way, is very much exercised over the subject of its official seal. It appears that the Council, without authority, communicated with Mr. Allan Wyon, F. S. A., of London, asking him to forward designs for a medal and seal. The designs were duly submitted and approved of by the gentlemen of the Council, who, without consulting the members of the Institute, gave instructions to Mr. Wyon to proceed with the work at once. It subsequently transpired that these precious dies will cost about £100. But the worst of it is that the design approved of is described as showing "an ancient Doric temple, with the Royal Arms in the tympanum." As one of the Fellows somewhat timidly remarked, a critical person might look upon a mediæval coat-of-arms in a Doric pediment as an anachronism. The members present, however, seemed to speak with more certainty as regards the cost, which they all condemned as excessive, and they thought the amount could be better expended in purchasing books for their library. The result of it all is that the President of the Royal Institute of British Architects is to be written to, and asked to inspect — and, I presume, amend — the design before the work is begun.

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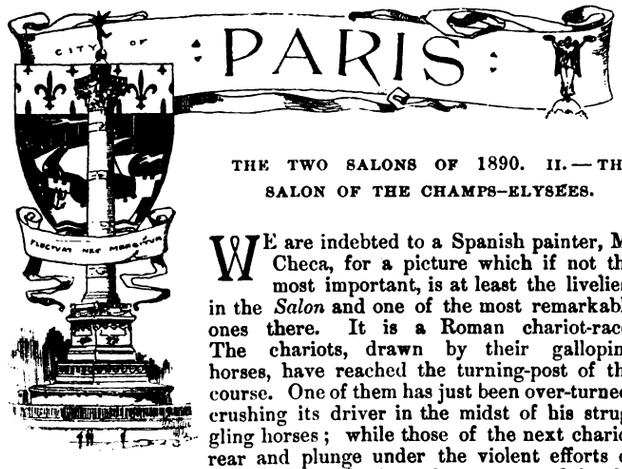
The Bioela graving-dock, which is the largest in Australia, and probably one of the largest in the world, has lately been informally opened, and everything is said to work admirably. As compared with the new dock lately opened at Halifax, the following table will show that the Sydney example has the advantage in nearly every particular:

	Sydney.	Halifax.
Total length	632 ft.	601 ft.
Width at top	108 "	102 "
" " bottom	44 "	70 "
Depth of water over sill	32 "	30 "
Width of entrance	84 "	89 "

Mr. Robert Louis Stevenson has just paid us a short visit, and is now returning to Samoa, where he is about to build himself a house, and where he intends to permanently reside. Samoa, according to the clever author of "*Dr. Jekyll and Mr. Hyde*," is an earthly paradise.



THE TWO SALONS OF 1890. II. — THE SALON OF THE CHAMPS-ELYSÉES.

We are indebted to a Spanish painter, M. Checa, for a picture which if not the most important, is at least the liveliest in the *Salon* and one of the most remarkable ones there. It is a Roman chariot-race. The chariots, drawn by their galloping horses, have reached the turning-post of the course. One of them has just been over-turned, crushing its driver in the midst of his struggling horses; while those of the next chariot rear and plunge under the violent efforts of their master. The driver of the third chariot endeavors to profit by the disorder, and lashes his horses to pass by into the first place: the beasts are foaming, and he himself, leaning forward, excites them still more with his cries. This tumultuous scene, which has for a background the brightly-lighted tiers of seats of the amphitheatre, with a triumphal arch half defined through the haze reddened by the setting sun, is rendered with astonishing fire. There are few works of such vivid interest, notwithstanding that it represents one of those antique subjects which have been so long out of fashion. Another classic theme, of a kind which few French artists now undertake, furnishes M. Auguste Glaize the inspiration for a picture of Saint Agnes in a house of pleasure; a cold and disagreeable piece of work. Stopping only before the principal things in the *Salon*, we notice first the mistake made by M. Benjamin Constant, who in a black and dismal picture, entitled the "Moonlight Sonata," represents Beethoven at the piano, playing in the dark. This mistake is not atoned for by another picture of a naked woman, called "Victrix," for whose sake the artist has renounced the warm and luminous colors of his ordinary palette.

Monsieur Bisson carries off this year a triumph of curiosity with one of those medical subjects which have been so fashionable of late years. The title is "After the Operation." The picture was ordered by M. Osiris, for the Hospital Necker; M. Osiris figures in it himself, as the subject of the operation, stretched on a bed, in a pose which suggests a model rather than an invalid. At the head of the bed Dr. Dotain examines a vial; around are grouped several celebrated physicians, among whom are Drs. Guyon and Segond. What is wanting to this picture, which is painted with much talent, is emotion; it is decorative surgery. But we must hasten, and pass more rapidly than they deserve the canvases of M. Detaille, which may be reproached with being rather too large in scale; of M. Rochegrosse, whose talent, so brilliant at its first appearance, is losing itself in minute and painful detail; of M. Aubert, whose "Last Moments of Saint Claude" is one of the most beautiful religious pictures we have had for a long time. We must not forget the distressingly perfect pictures of dead nature, by M. Desgoffes, or the broadly-treated subjects of MM. Bergeret and Fouace, the last a master of this style; and we arrive at last at the landscapes, which are of an incontestable superiority. Here we have difficulty in choosing; everywhere is the same devotion to true nature, rendered as she is, without attempt at prearranged effects; the decorative landscape of Jules Dupré, and even of Français, has given place to the landscapes of another kind, of Pelouse, Pointelin, Tanzi, Harpignies, Guillemet, Joubert, Gabriel, Gagliardini, Fath, Defaux, Yon, Berton, Décanis, Darien, etc. It would be necessary to name nearly all of them; but, at all events, the names we give are to be remembered.

But I had nearly forgotten the one, who, in the studios, has given his name to the *Salon* of the Champs-Elysées, Bouguereau. This distinguished artist has sent two pictures: in one we see "The Holy Women at the Tomb," a picture always equally careful in execution, correct, smooth, with porcelain-like reflections; — in the other, two little beggars seem to be emerging from a perfumed bath. Their smooth and transparent skin, their pink and polished nails, show that, notwithstanding the rags which cover them, they are accustomed to the most aristocratic cleanliness.

And now, a few words about the architecture, which ought, in this journal, to occupy the most important place. But if it is difficult to give at such a distance, an idea of the pictures in our *Salon*, the difficulty is still greater, perhaps, for the architecture, without entering into long and tedious explanations. As is the case every year, architecture at the *Salon* can be divided into two classes: that of practical constructions, and that of historical and archæological studies and restorations. I will not speak of the too-numerous school *projets*, which interest particularly the pupils of the Ecole des Beaux-Arts, and serve mainly to gain for their authors free admission tickets to the *Salon*.

Among the studies of restorations, two are particularly remarkable. The first is by M. Redon, who has studied, like a patient and conscientious artist, the temples of Baalbek and Heliopolis. On nine immense stretchers he shows us the actual state, and the restorations; and, as always, we ask ourselves what is the use of these learned works, which demand from an artist of such power, time which might, perhaps, be better employed in more living studies of modern architecture. But there is a revolution to be made in the organization of our school at Rome, which lives only in the antique, and by the antique, and seems to be unwilling to leave its dear ruins.

The second restoration is more curious. It is that of the Kmer monuments of Bapuon, in Angkor-Thom, Siamese Cambodia. M. Fournereau gives us a little rest from the architecture of columns and pediments, by showing us the treasures of this Oriental style, which is quite as monumental, and in which the richness of the details, of an amazing fertility of fancy, makes of each part of the structures a work of art, curiously sculptured.

Among the more practical, if not so brilliant, restorations we noticed that of M. Esquié, for the church of Venerque (Haute-Garonne), executed with a very delicate artistic sentiment. The architecture is all in brick, of a Spanish-Roman style, with much character. M. Charles Suisse has made an interesting restoration of the fifteenth-century spire of the Cathedral of Dijon; and we will mention further the restoration of the Château de Lestang (Indre-et-Loire), which M. Lafargue presents, with his talent as a skilful water-colorist.

The beautiful monastic church of Fontevrault, which forms a part of the abbey of the same name, has been the object of a very careful study of restoration by M. Ridel, who has joined to his formal architectural drawings some pretty water-color sketches. Finally, belonging to an order of ideas less monumental, but very curious, we remark the restoration, by M. Hardion, of the pavements and paintings in the oratory of Pierre d'Amboise, at Dissais (Vienne). The paintings, particularly, are of an exactness of execution in the primitive style which is pushed to miniature. When we speak of painting let us not forget the studies of mediæval mural painting in France, by MM. Laffilée and Gelis-Didot, reproducing frescos of the twelfth, thirteenth, fourteenth, fifteenth and sixteenth centuries, taken from the Cathedral of Reims, the churches of St. Savin, and Vic, the Cathedral of Le Puy, the temple of St. John at Poitiers, and the abbey of Roc-Amadour.

After we have assured M. Deverin that his restoration of the charming church of St. Jouin at Marnes (Deux-Sèvres), makes us wish for the preservation of this little architectural jewel in its actual condition; after we have mentioned, in passing, the curious antique fancy which M. Mayeux entitles "The Artemis of Ephesus"; the *mairie* at Suresnes, by M. Bréasson; the humorous compositions of M. Robert de Massy, and two theatres, inspired by Garnier's Opéra, by MM. Dupuis and Guissant, we shall have nearly finished with the architecture, about which the public cares so little. All the world, however, might interest itself in the beautiful model, at one-tenth the full size, of a monument to the glory of the Republic. It is a charming bit of decorative architecture, composed by M. Bréasson. The general form is that of a great truncated pyramid, mounted on an immense pedestal, flanked by four groups of sculpture at the angles, representing "Equality before the Law, Universal Suffrage, Education for All, and Liberty of Conscience." Another large composition presents also some interest. It is the design for the monument commemorative of 1789, which M. Louis Boileau studied for erection on the site of the Tuileries. It consists of a colossal portico, carried around three sides of a quadrilateral, with a grandiose dome in the centre of the longest side, carried by columns. It is a gigantic idea, which would have had the bad effect of crushing the neighboring constructions of the Louvre, and the elegant little triumphal arch of the Carrousel.

I have not left myself space enough to pass in review, even hastily, the section of sculpture; but it is necessary to speak of four unrivalled artists, who have sent works which are thoroughly remarkable: MM. Falguière, Chapu, Gérôme and Barrias. "The Woman with the Peacock," by M. Falguière, is a masterpiece. We have rarely seen a nude figure more noble and distinguished, more beautiful or more delicate in action. M. Gérôme, more successful this year as a sculptor than as a painter, exhibits a statue entitled "Tanagra." It is a naked woman, seated in an antique attitude, the bust upright, the knees close together, and the legs slightly bent; it

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has in its hand one of those little antique Tanagra figurines. The flesh portions are of an extraordinary softness, giving a strong impression of marble very faintly tinted. As for M. Chapu, he attracts attention by his magnificent monument to the writer Flaubert. A draped figure, recalling by its grace and sentiment the "Youth" of the Regnault monument, and the "Thought," by the same sculptor, is shown in high relief, leaning against a rock, on which is sculptured the medallion portrait of Flaubert. It is admirable. Another statue by the same artist, a dancing girl, is a graceful bit, destined to adorn the private house of one of our barons of finance.

Finally M. Barrias shows a delicious Oriental figure, seated on the ground, picking petals from a flower. This work, treated in wax, is to be cast in bronze, and is destined for the tomb of Guillaumot, the delicate and sentimental painter of Oriental scenes. It is delicate and sentimental, as suits its object.

LONDON

THE PROPOSED COLLEGE OF ARCHITECTURE. — THE LONDON TOWER. — THE CITY COMPANIES' AND THE EDUCATION OF MECHANICS. — A NEW MUSIC-HALL. — PROFESSOR HERKOMER.

WE are to have a College of Architecture in England. On Friday, May 30, the Association, after a long and animated discussion, passed the following resolutions:

1. That some more methodical system of study is essential in the Architectural Association, and that the need of such a system is emphasized by the recent publication of the Institute programme of progressive examinations.
2. That the mutual system, which was adopted by the Association at a time when the number of members was small, now presents great disadvantages and difficulties.
3. That it is advisable to adopt the Institute programme as the basis (but not the limit) of any systematic course of instruction established by the Association.
4. That a combination of lectures and classes is preferable to teaching in classes, or by lectures taken singly; and also that, as a general rule, instruction in any one subject is likely to be better imparted by a single teacher, but that, for advanced students, the system of visitors is in some cases preferable.
5. That, in formulating any curriculum of study, the work should, as far as possible, be so arranged as not to necessitate, generally speaking, more than twelve hours of evening work in each week.
6. That it is particularly desirable that an architectural studio be established by the Association.
7. That it is desirable that a course of day instruction be established on the same basis as the evening instruction.
8. That it shall be made possible for members to obtain books from the library during the day-time.
9. That, inasmuch as it would not be possible to carry out the proposed curriculum, relying only on voluntary helpers, it is desirable that additional paid teachers be appointed.
10. That this meeting approves the scale of fees mentioned in the report, subject to such modification as may be found necessary.
11. That it has become absolutely necessary that a paid assistant secretary be employed.
12. That this meeting considers that the annual subscription for town members should be raised to one guinea, and that for country members should remain as at present.
13. That this meeting approves the suggestion of the Committee that a Guarantee Fund and an Endowment Fund be established.
14. That the best thanks of the Association be expressed to those gentlemen who so kindly, considerately and ably assisted the Special Committee in the preparation of their report.
15. That the resolutions which have been passed be referred to the General Committee, with instructions to take the necessary steps to carry the same into effect.

This is, as you see, a thorough and complete endorsement of the Education Report of the Association's Education Enquiry Committee, of which I gave an outline last month, and it is difficult to overrate the importance of this action of the Association; and, if the scheme is worked out in a thorough, business-like way, and with reasonable fees, the simultaneous education of a large number of enthusiastic young students in the centre of a town of the extent and of the capabilities of London must produce better architects than men whose only source of information is a master or principal often nearly as ignorant as themselves. I cannot help thinking that English architecture, as a whole, will be very greatly benefited by a change in the education of its devotees, and, as the change now seems practically assured, it will be interesting to watch the effect of its influence in different directions.

The Strand Improvement Bill, promoted by the London County Council, came before the Parliamentary Committee several times in May. The chief fight has been on the question of "betterment," which I explained to you in a previous letter, and the opponents of the principle seem to have had the best of it. The Strand District Board of Works, for instance, denied altogether that the bill was being promoted for the special benefit of the Strand, but argued, on the contrary, that the London County Council were animated by a desire to widen one of the main thoroughfares of London, for the benefit of London as a whole. In addition to this, owners and occupiers in the greater proportion of the area scheduled in the bill as "bettered" strenuously denied that their positions would be improved in any way by the improvements contemplated by the Council. The Committee has reserved its decision.

I took an opportunity last week of visiting the designs of the English Eiffel Tower, which have been on view at the Polytechnic. They mostly resemble to a greater or less degree M. Eiffel's creation in Paris, and some are masterpieces of ugliness. One gentleman has evolved something very like a huge screw, while others have produced monstrosities of a wondrously complicated nature. Three or four utilized the lower portion of their tower for more or less elaborate buildings of the "Winter Garden" nature, while another conceived the project of building a tower over 1,200 feet high in stone. The exhibition, as a whole, is about the strongest proof of the absurdity of the idea that could well have been brought forward, and it is really to be hoped that the protest of the educated portion of the community will have some influence with those who are promoting the affair.

I am very sorry to have to record the death of one of the most promising of our architectural students, Walter Medlycott Duke. He was an exceedingly clever young fellow, bright, brilliant and original to a degree, and would have inevitably made his mark on the profession had he been spared.

The Association celebrated the end of session this year by a very successful ladies' night concert, given by the Architectural Association Lyric Club at the Conduit Street rooms. The Institute lent their rooms, and there was a good attendance of students and their friends. The New Association Committee was elected at the last meeting, and Mr. Leonard Stokes was again elected President, and Messrs. Baggallay and Cresswell, Vice-Presidents. Mr. Waterhouse, R. A., will probably be re-elected President of the Institute for the third time. I think such a lengthy occupation of the presidential chair is quite unknown in the annals of the Institute, but the fact is a striking example of the esteem and respect with which Mr. Waterhouse is regarded by his brother professionals.

The Armorers' and Braziers' Company is following the excellent example, set by many of the other city companies, of encouraging the education of mechanics following those particular trades which the various companies represent. For instance, the Plumbers' Company has instituted a regular examination in two or three different grades for plumbers; the Carpenters', Bricklayers' and other companies hold annual exhibitions of work, for which prizes are given, and a good competition usually results. Other companies, such as the Painters', have founded scholarships for the study of the higher branches of their particular arts, and, altogether, these movements on the part of these rich, powerful bodies bid fair to develop into highly valuable and useful educational work. The exhibition that the Armorer's Company have just held consisted largely of examples of metal-work, some being exhibits of old work from South Kensington, and some work of metal-workers submitted in competition for prizes. Altogether, there were some hundred and forty exhibits. Another exhibition of a different character is a collection of sketches from Egypt and the East by Mr. Ernest George, in water-color, at the Fine Art Society's galleries in Bond Street. The collection is not a large one, but very effective, the Eastern sky giving Mr. George an opportunity of indulging in brilliant coloring, which he has not been slow to take advantage of.

A new music-hall has been recently erected in the Strand, on the site of the old "Tivoli" Restaurant. The architect has just failed to make a successful design of his subject. It is undoubtedly original, but betrays a somewhat incomplete appreciation of the laws which govern architectural design. The interior is treated in an Indian manner, and decorated in a sort of pinkish red and gold. It is more of an oblong shape on plan than the usual horse-shoe arrangement, and is noteworthy for a particularly pleasant arrangement for lighting, whereby the usual sunlight is replaced by a number of electric-lights depending in an irregular manner from a sort of glazed ceiling-light, behind which lights are also burning, the general effect of the whole being very pretty.

Professor Herkomer has been admitted into the sacred ranks of the Royal Academicians. This honor is bestowed on a very worthy recipient. The Professor's capabilities and versatility as an artist are well-known, and his art-school at Bushey is another mark of his great energy. It is, however, a matter of some little regret that the Professor has not yet succeeded in imbuing his students with that intense enthusiasm for art which is his own marked characteristic. Of course, it may be that no brilliant genius has yet come under his genial care, but the fact remains that very little first-class work has been produced by those who have received their education in the Professor's studio or school.

Mr. Banister Fletcher, the well-known writer on architectural law, has been elected Professor of Architecture at King's College, in the place of Professor Kerr, resigned.

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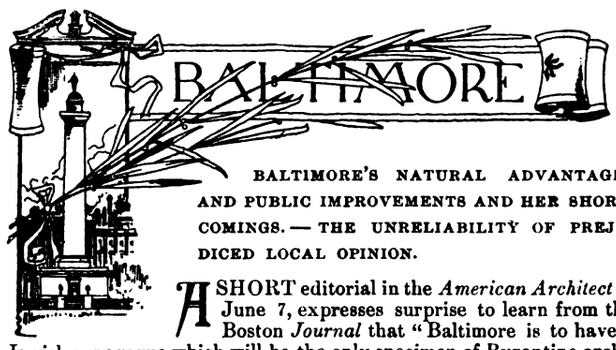
The Royal Academy opened its doors at the beginning of May, but I have not yet had time to examine the drawings in very great detail. I hope to be able to give an account of the principal works exhibited, next month.



BALTIMORE'S NATURAL ADVANTAGES AND PUBLIC IMPROVEMENTS AND HER SHORTCOMINGS. — THE UNRELIABILITY OF PREJUDICED LOCAL OPINION.

A SHORT editorial in the *American Architect* of June 7, expresses surprise to learn from the Boston *Journal* that "Baltimore is to have a Jewish synagogue which will be the only specimen of Byzantine architecture in the United States"; and, in further comment on this statement, goes on to say " . . . so much harm is done to the development of architectural knowledge and taste by the ridiculous ignorance of the people who write about architecture in the daily papers, that it is doing the public a service to hold up to derision the worst of these blind leaders of the blind." In this action we would cordially co-operate, if thereby the desired object, accurate description and intelligent criticism, might be obtained. The truth or error of the special statement referred to above is not the question of most importance; it was probably not obtained from the architect's office, though it may have been taken directly from a Baltimore newspaper. Can we hope, however, that mankind will ever come to believe that truth is stronger, as well as stranger, than fiction, and that, acting on this conviction, the press, the municipal official, the popular public speaker or writer, will ever learn to adopt reasonable accuracy and judicious reserve in their enthusiastic descriptions of local advantages and improvements, instead of the absolutely false statements and perfectly worthless eulogies and comparisons that now so widely obtain, ridiculous to the more intelligent and better-informed citizen, but misleading to the ignorant, and the greatest obstacle to any benefit that may accrue from the force of public opinion in regard to the real improvements and adornments of a city.

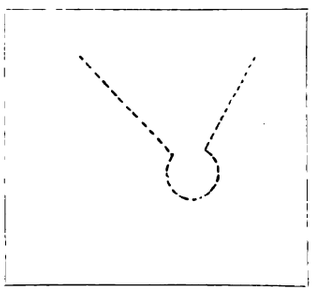
There is, undoubtedly, a degree of truth in the assertion that the architect himself is the best public teacher, and that the only text-book he needs is his executed work, but, like all such broad assertions, this only covers a small portion of the ground, leaving a much larger field open to other educational influences, inasmuch as those who have sufficient information, natural intelligence or intuitive good taste to appreciate the difference between a good and a bad thing when they only see it, are few in number compared to the mass of those totally ignorant. It may be accorded also that, up to a certain point, massive and simple grandeur will often appeal alike to the educated and the ignorant, but even this is not invariably so, and, when we approach the question of detail, the appreciation of simplicity, elegance, refinement and appropriateness, over excessive and commonplace elaboration, seems, with rare exceptions, to be in the direct ratio of knowledge and cultivation. These must be supplied to the people through some pervading source, wide-extending as the public press, and as the universal tendency seems to be to regard such high authorities as the daily papers and civil officials of any grade, as also infallible guides and critics in all matters — even of art — it is evident how potent, for good or evil, their influence may be as popular educators. Nowhere is this evil of journalism, speechifying and interviewing about matters of city improvements, architecture, and superior advantages in general, more flagrant than in Baltimore, giving rise to a dangerous degree of self-complacency and local pride and prejudice, often totally unwarranted by facts and arising largely from a plain misstatement of them — a harsh expression perhaps, but, unfortunately, a true one. For no intelligent citizen will deny that the state of public opinion which is continually led to assert that Baltimore's natural advantages, public improvements, liberal and judicious expenditure of money, and general attractions from nearly all points, have always been and always will be somewhat better than those of its neighbors, is not the most healthy condition in any community for maintaining the high rank claimed — in the great pressure and struggle for precedence in the nineteenth century.

Let it be admitted also that, in the long run, the decree of public opinion, after all, is the one nearest to the truth as to what is really good or bad. Such public opinion, however, must not be merely local, naturally influenced by contracted interests and prejudices, and generally the result of only limited experience and knowledge. We award the greatest deference to the opinion of the intelligent, well-informed, reading, thinking, travelled and unbiased public, as perhaps the very soundest authority on all such matters.

And now, turning to facts, what does such an authority as that say about Baltimore among other cities: First, we must note that the various features of a city can readily be divided under three simple heads, by way of easy comparison with other cities sufficiently similar in age, size, location, etc., namely, the few things in which it notably excels others — the few in which it is decidedly inferior — and the very large majority in which it is not in any way remarkable, hence the field for the use of superlatives of either praise or blame is limited, and it is undoubtedly wise and wholesome to urge the people again to dwell on this, though it has been repeatedly done before.

Baltimore possesses a temperate and fairly healthful and agreeable climate; a charming location, near its great bay and upon its many hills; a site that offered possibilities for phenomenal artistic development in architecture (neglected; with few exceptions); it is one of the most economical places in the country for gastronomic and other material comforts and luxuries of life; its people generally show the evidences of a long-time culture and refinement, and are much given to social pleasures and hospitality. Under the influence of its libraries, its great University and Hospital, and other institutions, it has become a centre for literary, scientific and charity work, and it has one private art-gallery of exceptionally rare value and interest. Its streets are broad, generally clean, and well adapted to its system of surface-drainage (in spite of very much bad and very little good paving). One or two localities are impressively handsome in their surroundings, notably Mt. Vernon Place. What remains of its domestic architecture of fifty years ago or more is full of merit and interest, and the Washington Monument is one of the finest designs of the kind in modern times, in any land. The Druid Hill Park has great natural beauty (inferior in its artificial adornment and keeping), and the surrounding suburbs are extremely attractive by Nature (but only beginning to be properly developed in the last few years).

All these points of excellence are undeniable, but, unless one persists in looking only through rose-colored glasses, these other things will be plainly visible to unblinded eyes. A bird's-eye view will show that in a city whose corporate limits are, approximately, six miles square, as here shown, more or less, a circular area of about half a mile radius, with the corner of Baltimore and Charles Streets as a centre, and a segment in a northwesterly direction, as indicated by the dotted lines, contains the limits within which is to be found all that can claim any architectural merit, perhaps with a very few isolated exceptions.



Beyond these limits we find an area of many miles of wide, badly-paved and badly-kept streets and suburban lands, built up of cheap and poorly constructed houses of a monotonous type, totally devoid of interest. There is a conspicuous lack of any systematic or concentrated scheme of public improvement in any one direction, and a consequent absence of imposing monumental effects. Both the number and importance of new buildings of architectural merit, public or private, are less than in any other cities of the same grade. Such public structures as railroad stations, hotels (with one exception) and theatres (with one exception) are below the average standard for a city of this rank, while it does not possess either an art gallery or a music hall worthy of the name. Gladly would Baltimore's truthful admirers deny these facts if it were possible.

Now in spite of all these things scarcely a day passes that the public are not treated through the daily papers, as it were officially and *ex cathedra*, in the way of local items, editorials, reports of speeches and the like, with the most dogmatic assertions to prove that this is the garden spot among American cities for the best enjoyment of *all* the pleasures of life. The noble streets and avenues are referred to; the park is the most beautiful *in the world;* the Academy of Music, a large theatre, with some good points of arrangement, which was coincidentally first opened at the same time as the Paris Grand Opera House, is favorably compared with that gorgeous monument; and the newly laid-out Mt. Royal Avenue, a wide street through the best section of the town about a mile long — as yet unpaved — starting from no point in particular, and ending at the park entrance by the side of a huge livery stable, with no other buildings upon it but a partially finished church and one or two groups of very insignificant houses, has frequently been spoken of lately, by a very high official indeed, as "one of the handsomest Boulevards in the world." Such comment as this is almost too absurd to be criticised, and yet against just this we must protest, for Baltimore, or for any community, as most harmful to the right public spirit that results in real improvements. It is a midsummer's day, and midsummer is perhaps an easy time for broad generalizations. Theories, the statistician will tell us, can only be built on facts, but after we have gotten one set of facts, we can only stop to look them over broadly and theorize a little before we go on further upon the line of progress, lest we take a wrong direction or bury ourselves in a rut so deep that we cannot see over its edges. We are on the borders of July and with the summer solstice the "Fall of Pompeii" has come unto us. Vesuvius is in our midst, and if, perchance, on some fine night its floods of burning lava should burst the legitimate bounds of its board-fence, and bury the whole of old Baltimore for centuries beneath its ashes, in spite of all the faults we can find we would mark the spot with the epitaph found upon the grave of the old lady in a New England church-yard, "She was so pleasant."

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BOSTON

THE EXHIBITION OF THE BOSTON ARCHITECTURAL CLUB.

THE Exhibition of the Boston Architectural Club, which has been open for three weeks at Horticultural Hall, was well worthy of the attention of the public, both professional and non-professional. There was not only double the number of drawings exhibited in any previous exhibition of architectural work in America, but they were of an unusually high standard of excellence. The Club undertook a very considerable task, and carried it out successfully, in spite of the fact that the average daily attendance of 200 persons was less than hoped for, and very much less than the exhibit of drawings deserved.

Apart from the decorative designs from the Museum of Fine Arts, there were some 1,200 drawings received, of which over 400 were rejected, leaving an exceptionally good selection to be hung on the walls. Naturally, there will be objections raised by the unfortunate rejected contributors, but in relation to this there is a word to be said. The wall-space to be covered was about 5,000 square feet. Many of the rejected drawings were tolerably good in design, but would, if hung, have occupied more space than they deserved. A large drawing requires more than ordinary merit, either in design or rendering, to justify its superficial area when hanging-space is limited; and, in hanging drawings, the larger ones usually have pre-emptive rights for central positions, merely because they cannot be made to occupy any other space agreeably. For this reason, and for this reason only, the drawing of the Court-house and of the Prix de Reconnaissance, by M. Eustache, were placed on the end wall upon the platform, in a position that would usually be the place of honor. The hall was arranged with a central aisle and four alcoves on each side. The first alcoves right and left contained water-colors. On the right, in order, were the alcoves for foreign sketches in pencil and for wash-drawings; for the school-work of the Ecole des Beaux-Arts, the School of Mines of Columbia College, and the Architectural Department of the Massachusetts Institute of Technology; and the alcove for decorative work, largely occupied by designs from the Class in Decoration of the Boston Museum of Fine Arts. On the left, the second alcove contained pen-and-ink renderings, the third English drawings, supplemented by some American pen-and-inks, and the fourth photographs. The central aisle had water-colors at one end, and pen-and-inks at the other.

There were one or two general facts to be noticed: that the exhibition was, perhaps, somewhat too much confined to contributions of local men; that a very large percentage of the exhibitors were the younger men of the architectural profession; that the water-colors were of great excellence; that the pen-and-ink work had materially improved within the last three or four years; that the school-work compared very favorably with what of the Ecole des Beaux-Arts work was present, and that the decorative work had a great deal of merit; and that the Philadelphia exhibitors sent some of the best drawings on the walls.

It was a disappointment that search disclosed but one drawing of Messrs. McKim, Mead & White, and none from Messrs. Babb, Cook & Willard, Carrère & Hastings, R. M. Hunt or George B. Post, nor any designs from John La Farge. The West was not adequately represented, though what drawings were sent were of the best of the Western work.

The Rotch travelling-students' drawings were capital renderings of a very difficult and uninteresting problem. Upon entering the hall, Mr. Newton's water-color sketch of an imaginary hotel compelled attention by its size and color. It was a capital piece of design, strongly rendered. Opposite was Mr. Schweinfurth's design for a similar subject, equally well done.

In the first alcove at the right, Mr. Fernald's water-colors of interiors, by Mr. Arthur Little, were wonderfully well done, delightful in color, unusually rich in tones, and with a fidelity of detail that touched the happy medium between hard realism and uncertain suggestion. The gradations of shadow in the white-finish, the delicacy of the tints in the papers, and the quality of the stuffs were of a character usually little understood by an architectural draughtsman. Mr. Rotch's Moorish sketches failed to give the delicacy of the Granada and Seville work, as all broad sketches of such work must fail of necessity. Mr. E. C. Cabot was represented by a charming bit of Venetian color. Messrs. Sturgis & Cabot had a perspective of a very comfortable, quiet, stone country-house, and Mr. Walker was represented by water-colors of the interior of one of the special libraries in Messrs. McKim, Mead & White's Boston Public Library Building, an interior of the great central hall of Mr. Clough's Court-house, and the design for a church at Springfield, which received the silver medal at the Cincinnati Exhibition; Mr. Schweinfurth by a large drawing of the tower of St. Mark's. In the opposite alcove, the place of honor was filled by Mr. Waterhouse's design for the Liberal Club, and two drawings by Mr. Nattress of the exterior and interior of Brompton Oratory. These drawings were as carefully rendered as are most English water-colors, but less painfully minute than are many. Mr. Nattress's best work, however, is his drawing of an oriel window, a very beautiful piece of color and rendering.

McKay & Smith had a large drawing of a church at Newton. On the same wall was a charming sketch of the Alhambra by Mr. Newton, and a bird's-eye view of a proposed suburban colony of houses at Longwood by Mr. Warren, very well rendered. Opposite was a very refined design for the Boatmen's Savings Bank Building, St. Louis, by Eames & Young, and the Hotel Ludlow, by Walker & Best. Near at hand were water-colors of the Abbott House, Cambridge, by Messrs. Longfellow, Alden & Harlow, and of the Harriswood Crescent by J. Williams Beal, rendered by Eldon Deane, and an interior of the large hall of the Millard Hotel, Omaha, by Walker & Best.

At either side of the centre aisle were water-colors of entrances to houses in Troy by H. Langford Warren, which were in many ways remarkable pieces of work; the use of brick and marble, the sense of delicate proportion, and the value of contrasting color being marked in both, and the rendering, so difficult to make agreeable where there is a large mass of brickwork, was wonderful in its expression of values, tones and material. One of these was by Mr. Warren himself, and one by his brother, the artist, Mr. Harold B. Warren. Altogether, they were very unusual both in design and rendering.

Further down the aisle, on the right, was Mr. Langerfeldt's drawing of Chamberlin & Austin's Cambridge High-school, a building of great scale and restraint, in which the repeated arch motive, flanked by masses of building, was very well handled. Opposite was Mr. Deane's water-color of Andrews & Jaques' competitive drawing for the Chamber of Commerce, a design of much dignity, excepting at the top of the tower, and one of the best of Mr. Deane's colored drawings. The other large water-colors in the aisle were designs for small town libraries in brick and in stone by Cabot, Everett & Mead, rendered with much *chic* by Mr. Mead; a design for the Kansas City Boston Building by J. W. Beal, rendered by Mr. Bosworth, which certainly bears no comparison to the very successful building erected by Winslow & Wetherell; a very attractive water-color of the Willard School, Quincy, by Sturgis & Cabot; and an extraordinary imaginary Italian town by Mr. Schweinfurth. Of the large pen-and-inks further down the aisle, the Stone Gap Hotel, by Messrs. Winslow & Wetherell, and the design for State Library and Office-building, by H. S. McKay, and a Château, by Mr Schweinfurth, were the most noticeable.

In the alcove for drawings in slight washes, by far the most interesting were the two designs of Messrs. Cope & Stewardson of Philadelphia, for a building for the Pennsylvania Company for Insurances. One of these was in brick, the other in marble with a Corinthian portico. These were designs of the very highest rank, such designs as would compare favorably with work of the best period of the Renaissance, full of refinement, delicacy and proportion, and only open to the objection that they were out of scale with their surroundings, and were conceived in a style and magnitude that would best fit isolated monumental buildings. Of the two, the design in brick was the more frank and direct and with less affectation of Classicism. If this is the sort of rendering of Classic motives that architecture in America is to have in the future, there is every reason for congratulation. The rendering by Mr. Truscott was not a whit less distinguished than the designs. Next in importance and in a totally different key, but of exceptional merit were the designs by Gilbert & Taylor of St. Paul. These were of the picturesque type handled in the best manner, and were for the Bear's Head Inn at White Bear Lake, the Town and Country Club near St. Paul, and for a cottage at White Bear Lake. They were delightfully drawn by Mr. Gilbert in his suggestive style of rendering. Two drawings of Mr. Andrews, one in sepia of a church and a free soft-pencil drawing of a house at Brookline, were noticeable.

A number of Mr. Emerson's well-known sketches for country-houses and a frame of Mr. Peabody's pencil-sketches of several houses and of Divinity Hall, built by Peabody & Stearns, showed plainly that the younger men were not to have it all their own way, for both had the individual charm which has not been repeated though often imitated. There were also some ingenious and delightful interiors freely rendered in sepia by Wilson Eyre, Jr., and some excellent measured drawings of old houses at Bayeux and Lisieux by A. S. F. Kirby, and a church by Cram & Wentworth. The foreign sketches were of great merit and several new names appear in the list of the contributors of this work who show that by their touch and sense of color they are not at all behind their predecessors in the same field. The names only of those who were well represented can be given, these were Messrs. Eyre, Cope, Day, Stewardson, and Miss Millicent Drake of Philadelphia; Brunner, Howard Randall, Meeker of New York; J. G. Green of Brooklyn; Eames of St. Louis; Trowbridge, Burdette of Buffalo; Gilbert of St. Paul and Pond of Chicago; Blackall, Newton, Mead, H. Bacon, Jr., Schweinfurth, Denman Ross, Linden Smith, Ross Turner, Chamberlin, Dwight Blaney, J. A. Van Straaten, Jr., Arthur Rotch, E. C. Cabot, Eldon Deane, Walker of Boston. Of these, the water-colors of J. Linden Smith and the sketches in Holland of J. A. Van Straaten, Jr., were to be especially remarked. The alcove devoted to school-work had *rendus* by students of the Ecole des Beaux-Arts; of the School of Mines, Columbia College, and of the Massachusetts Institute of Technology.

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Amongst these H. C. Ripley's hotel and T. R. Kimball's drawing was especially noticeable. All school-work is necessarily mannered and preferably so, but there were one or two innovations evident, one that the Institute work is growing in the importance of the problems given, and that designing and perspective is required.

The last alcove on the right glowed with the designs in color of the Class in Decoration of the Museum of Fine Arts. There were designs for all imaginable fabrics, for architectural interiors, ceilings, mantels, etc., wall-papers and stuffs, rendered in water-colors with in many cases, much skill both in design and color. Of these the most noticeable were by Misses Brown, E. Child, K. Child, Inman, Sheldon, Morse, Gray and Temple, and by Messrs. Cabot and H. C. Sears.

Upon the platform, the Rotch Scholarship drawings, several *rendus* of H. Bacon, Jr., and Mr. Schweinfurth's design for the Grant Mausoleum were worthy of notice; little else at this end of the hall.

In the photograph alcove, Messrs. Sturgis & Cabot had a number of attractive interiors, bromide prints colored, and Cabot, Everett & Mead a large sun-print of Hastings Hall. There were also a number of photographs of work in England by Mr. T. W. Cutler of London, sumptuous but commonplace; some interiors by Mr. Martin Aiken of Cincinnati, and exteriors by James T. Kelley of Boston and C. O. Arey of Cleveland.

The pen-and-ink alcove contained sketches of country-houses, among which were several by Appleton & Stephenson, Peabody & Stearns, Glenn Brown, James Brown Lord, Clarence Luce, Rossiter & Wright, Chamberlin & Whidden, Mason & Rice of Detroit, Stevens & Cobb of Portland; an attractive set of outline interiors by Charles T. Mott, and the design for St. Mark's School by H. F. Bigelow. But by far the most interesting set of pen-and-ink drawings were those of large business buildings, in most cases rendered by Mr. Gregg with the restraint, contrast and force of his usual rendering. These buildings are instructive, for by necessity they are forced to be without plagiarism and by economy to be the simplest solution of a business problem of investment. They are unique, and are almost the only type of modern architecture that depends upon proportion and skill for their effect, and they are certainly the most encouraging outcome of the present architecture of America. Very few of them but what have dignity of mass, simplicity of treatment and an attempt at least at good proportions and a general sobriety and restraint of effect that is most commendable. It is noticeable that those whose enrichment is confined to the top and bottom of the building alone, are the best, that wherever extravagance of fancy has shown itself the result has been pitiable. The simplest of these designs are by Winslow & Wetherell, Peabody & Stearns, C. H. Blackall, Shepley, Rutan & Coolidge, Andrews, Jaques & Rantoul, Longfellow, Alden & Harlow, Green & Wicks, Carey & Trowbridge, Walker & Best, Hartwell & Richardson.

The English alcove is interesting especially from the exhibition of the drawings of Herbert Railton, which for depth of tone, touch, and sense of color far surpassed the gray sketchy and broken drawings of Raffles Davison that cover the opposite wall. When will Mr. Davison learn that he cannot draw the human form and that his claims to attention are in his judicious choice of architectural subjects and a certain medium facility in rendering detail. Mr. Pennell's work, shown also in this alcove, lacks value and is painfully sketchy in places, but compared to Mr. Davison's it is masterly.

Certainly Mr. Pennell would acknowledge, himself, that he had erred when he stated in his book on rendering that he knew no architectural draughtsmen who could do artistic work, for the walls of two of these alcoves had work superior in artistic quality, apart from their architectural truth, to what was shown of Mr. Pennell's own work. To be just, however, it should be acknowledged that it is far from being his best work. English architecture was also represented by designs of Basil Champneys, and by several drawings by Bidlake of Leonard Stokes' work, quiet and with a good deal of charm, and by two of Mr. Ernest George's inimitable drawings. There were some attractive designs of decorative work by Prentice Treadwell, the Tiffany Glass Company, Louis Haberstroh and Edwin Ford, and Mr. Ford's large window at the end of the Hall was very rich in tone and vigorous in drawing.

ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

THE HARLEM CLUB HOUSE, CORNER OF 125TH STREET AND LENOX AVENUE, NEW YORK, N. Y. MESSRS. LAMB & RICH ARCHITECTS, NEW YORK, N. Y.

[Gelatine Print issued only with the International and Imperial Editions.]

CENTRAL SAVINGS BANK, CANTON, OHIO. MR. GUY TILDEN, ARCHITECT, CANTON, OHIO.

STUDY FOR A CHURCH. MR. W. W. POLK, ARCHITECT, KANSAS CITY, MO.

ODD FELLOWS BUILDING, FORT WAYNE, IND. MR. F. B. KENDRICK, ARCHITECT, FORT WAYNE, IND.

THIS building, which is now being erected on Calhoun Street, will cost something over $35,000 and is to be completed in December. It is of buff sandstone, except the corner column, which will be polished Georgia mottled marble. The ground-floor will be occupied by stores, the second and third floors for club-rooms and the upper floor by the Odd Fellows. The building is about eighty feet high and the ground plan sixty by seventy.

SKETCHES BY A ROTCH TRAVELLING-SCHOLAR. MR. E. A. JOSSELYN.

SKETCHES OF WROUGHT-IRON WORK. MR. T. F. LAIST.

[**Additional Illustrations in the International Edition.**]

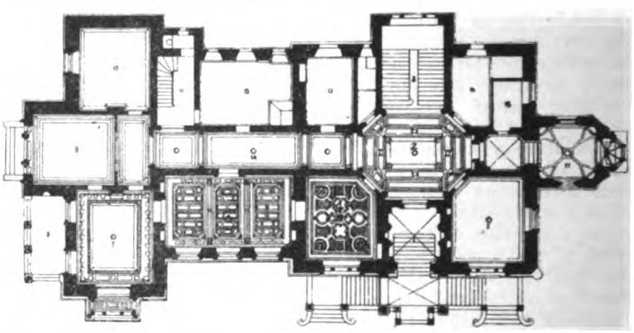
HOUSES IN BUDA-PESTH, AUSTRIA. HERR FR. LASZLO, ARCHITECT.

[Gelatine Print.]

VILLA IN WIESBADEN, GERMANY. HERR A. SCHELLENBERG, ARCHITECT.

[Gelatine Print.]

HOUSE OF HERR EDUARD PURICELLI, LIESER, ON THE MOSELLE, GERMANY. HERR H. TH. SCHMIDT, ARCHITECT, FRANKFORT ON THE MAIN, GERMANY.



1. Vestibule. 2. Hall. 3. Main Staircase. 4. Reception Room. 5. Gentlemen's Room. 6. State Dining-room. 7. Family Dining-room. 8. Veranda. 9. Billiard-room. 10. Guest-room. 11. Back Staircase. 12. Kitchen. 13. Cook's Room. 14. Back Hall. 15. Servant's Hall. 16. Sacristy. 17. Private Chapel.

NEW SCOTLAND YARD: THE CHIEF OFFICE OF THE METROPOLITAN POLICE, THAMES EMBANKMENT, LONDON, ENG. MR. R. NORMAN SHAW, R. A., ARCHITECT.

NEW PULPIT, ST. MICHAEL'S CHURCH, BOURNEMOUTH, ENG. MR. REGINALD G. PINDER, F. R. I. B. A., ARCHITECT, BOURNEMOUTH, ENG.

THE design is Early English. The body of the pulpit is octagon in plan, entered by a short flight of six steps from the north transept. It stands on a circular, central base-shaft and a base arcading. On five faces of the octagon are panels (designed by Mr. J. W. Warren, artist, of Bournemouth), sculptured in the following subjects: Centre panel, "St. Michael" (adapted from the picture by Raphael in the Louvre, Paris). Legend, *Michael Princeps vester.* 1. "Jacob's Dream." Legend, *Domus Dei et porta cœli* (Genesis xxviii, 17). 2. "Lot's Escape." Legend, *Salva animam tuam* (Genesis xix, 17). 3. "Apostles sent to Preach." Legend, *Loquimini omnia verba vitæ hujus* (Acts v, 20). 4. "John and the Angel." Legend, *Adora Deum* (Rev. xxii, 9). A carved cornice runs round the top of the pulpit, and a book-desk forms a canopy over the central figure. The pulpit stands in the same position as the old one, close to the east respond of the north arcade of the nave. The hand-rail to steps is of brass and wrought-iron, the steps themselves of polished Hopton wood stone. The interior of the pulpit has an oak floor, linings and inner capping. The cornice, book-desk, canopy and body of pulpit are in alabaster, and the small shafts in arcade of green Yealmpton marble. The central base-shaft is in red Ogwell, and the base arcade in bird's-eye dark Ashburton (dark gray). The work has been executed by Messrs. A. W. Blackler & Son, of Torquay, and has cost nearly 300*l.*

SYSTON CHURCH, NEAR BRISTOL, ENG. MESSRS. CHRISTOPHER & WHITE, ARCHITECTS, LONDON, ENG.

WE give a perspective view, showing the restoration of Syston Church, near Bristol. The church is a very small one, but of considerable interest, containing, as it does, a lead font of the Norman period, enriched with figures and ornaments under arches, and two chained Books of Common Prayer of the seventeenth century. The church consists of an Early English chancel, Norman nave, with later insertions, the tower being built in the fifteenth century into the Norman nave. The roofs of the nave and chancel were of comparatively recent date (about 150 years old), without any detail

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whatever, and were plastered at the level of the collars; but a small portion of the original roof remains on the south side of the tower, which gave a clue to the character of the old work, which appears to have been an open barrel with tie-beams. The whole of the roofs have been reconstructed, except the old portion above referred to, which remains intact. In the restoration of the chancel a barrel-roof has been put, but in the nave, owing to the great weight of the stone slates, which have been re-used, an open-truss roof has been constructed, raising the tie-beams as collars, with curved braces under. The chancel contained four square pews, and there were three fire-places, but these have been removed and the chancel rearranged with oak choir-benches, and the old late seventeenth-century pulpit has been repaired and refixed, and a portion of the nave pews have also been rearranged. The gallery at the west end has been removed, and the tower arch opened out. The windows in the tower and the parapets were inserted about seventy years ago, and were of the Gothic of that period.

The parish being a very poor one, the restoration of the belfry windows and new top to the tower, as shown in the drawing, has had to be postponed for the present, as the expenditure on the more necessary portions of the work was as much as could be undertaken with the funds available. The earth of the churchyard on the north side was up to the level of the window-sills. This has been removed, and the old stone paving relaid round outside the walls of the church, and a gutter formed. The inner porch-door on the south side has a good bit of Norman work, and there is a similar doorway on the north side of rather earlier date and finer workmanship, but merely moulded, whereas that on the south side is enriched, and has a carved tympanum. The north doorway had been partly filled-in and converted into a window. As the insertion of the window inside the doorway is most apparent, but not unsightly, it has been left.

The restoration works, beyond what has been previously mentioned, include repaving, general repairs, new heating apparatus, strengthening bell carriages, and new lead roof to tower, etc.

HOUSE, EAST LYSS, HANTS, ENG. MESSRS. CHRISTOPHER & WHITE, ARCHITECTS, LONDON, ENG.

WE give an illustration of a house recently erected at East Lyss, Hants, for Mr. Robert Barnes, M.D. It is built of red brick, with gauged-brick dressings, and roofed-in with hand-made local tiles. The sitting-room chimney-pieces were all specially designed by the architects, and were made by Mr. James Forsyth, sculptor. The sitting-rooms are all approached through the inner hall, a room twenty feet square, from which starts the principal staircase to the first floor, the staircase being of dark oak.

COMMUNICATIONS

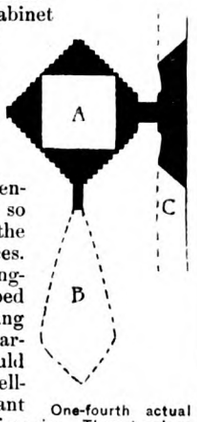
[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

FLAT KEY LOCKS.

BELFAST, IRE., May 2, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

Dear Sirs, — There are two articles made in the United States and are in ambush to me, but I know they exist, as I at one time saw them. The one is a "cabinet or safe-drawer lock," and the other is a "safe or strong-room door crank handle." Please how could I find out what firm makes a cabinet or safe-deposit box-lock, containing either six pin tumblers or six levers in one lock, or a lock to contain from eight levers or pin tumblers each, up. How much per copy is *American Architect*, an old copy containing an article on this lock subject preferred, or who in England sell the journal, so that I could obtain, now and again, a copy of it. I hear of Sargent & Greenleaf's locks: have they a firm in Boston, if so kindly send this to them, perhaps they make the above locks, for their catalogue of sizes and prices. This crank handle is on most of American strong-room doors. *A* is solid, square, cone-shaped stepped turnings all over square. *B* is the hanging tail where you grip to turn. I forget its appearance. *C* is the portion next to the door. I would remit for a drawing for my recognition, it is well-known in America for the above purpose. I want *no* other design. I would pay for an engraving from you. Yours truly, JAMES MAGUIRE.



One-fourth actual size. These turnings on square A are round step by step. This is a side-view of the handle.

[THE Sargent & Greenleaf Company, or the Yale & Towne Company, make locks with six or more pins or tumblers. The sketch of handle does not give any clue, as a handle of any shape may be used with a given lock. Address for catalogues, Yale & Towne Manufacturing Company, 62 Reade Street, New York, or the Sargent & Greenleaf Company, 101 Maiden Lane, New York. Blackall's "*Builders' Hardware*," (price $5.00, published by Ticknor & Co.,) treats very fully of locks. Copies of the *American Architect* can be had by sending directly to Ticknor & Company, 211 Tremont Street, Boston. — EDS. AMERICAN ARCHITECT.]

NOTES & CLIPPINGS

THE PORCELAIN TOWER AT NANKIN.—In 1430 A. D., after nineteen years of ceaseless labor and an expenditure of about $4,000,000, the Chinese government finished the wonderful porcelain tower at Nankin, which stood for nearly four and a quarter centuries, until 1856, the most marvellous building ever erected by human hands. It was of octagonal form, 260 feet in height, with nine stories, each having a cornice and gallery without. The name of Porcelain tower was applied to this unique structure on account of the fact that the whole of the outside work was covered with porcelain slabs of various sizes and colors, but principally of red, white, yellow and green. At every one of its nine stories the projecting roof of the gallery was covered with green tiles, each corner being provided with a bell varying in weight from 300 to 1,000 pounds. There were 152 bells in all, each so nicely balanced as to rock back and forth as they were swayed by the breezes, giving out a continuous strain of beautiful but weird music. Ranged in rows between the bells were 128 brass, bronze and silver lamps, which were lighted every night in the year. The apex of the tower, starting from its base at the 250-foot level and extending upwards for a height of ten feet, was a monster gilded pineapple, surmounted by a copper ball about two feet in diameter. A spiral stairway of over 300 steps led from the base to the summit. The building was constructed as a gift to an empress, and was always kept in repair by the government. Lightning struck it in 1801 and tore down the three top stories. The injury was repaired as soon as possible. It would probably be standing to this day had not the Taiping rebels imagined its lights and bells disastrous to their cause. — *Commercial Advertiser.*

THE CATHEDRAL OF CARTHAGE. — On May 22 the solemn consecration of the new basilica of Carthage — the only Cathedral church in Africa — was celebrated by Cardinal Lavigerie in the presence of forty archbishops and prelates of high rank. At a later hour in the afternoon His Eminence inaugurated the opening session of the Council of Bishops, the first of the kind which has taken place there since the year A. D. 252, by St Cyprian. The cathedral is perched on the summit of the Byrsa Hill amidst the ruins of the old acropolis, and on the very site of that famous heathen temple of Æsculapius, in which, at the close of the last Punic War, B. C. 146, the Carthagenian commander took refuge with his wife, children and some Roman deserters, determined to defend themselves to the last and to perish among the ruins. Hasdrubal's heart, however, failed him; and while his family and his followers met bravely the doom from which he so meanly shrank, he surrendered himself to the Roman conquerors who, after causing him to march in chains in the triumphal procession of the victorious general through the streets of the Eternal City, subsequently tortured him to death. The cathedral presents a very striking appearance with its dazzling white towers and minarets. Its architecture is a mixture of the Roman and the Byzantine, and it is built of a brilliant white chalky-looking stone, which has been quarried in the island of Malta. Within it is divided into nave, transepts and gallery, and the roof is supported upon 142 columns of white Carrara marble. The woodwork is of pitch pine and the walls are decorated with exquisite colored Tunisian faience. The ceiling has been painted by native artists with a profusion of arabesques, but in accordance with the prescriptions contained in the Koran, they have carefully avoided all designs representing either human beings or animals. The cathedral dominates the entire surrounding country, standing on the top of the steep hill up the slope of which a body of some 8,000 pilgrims from all parts of the world wended their dusty way on the day of the consecration. They were followed at 10 o'clock by the 4th Regiment of Zouaves, which, preceded by its band, served as escorts to the marvellously chiselled gold and jewelled casket that contained the relics of St. Louis, the Crusader King of France. The latter perished some half dozen centuries ago, almost on the very spot where the cathedral, erected in his honor and bearing his name, now stands. The relics were placed on the high altar at the foot of the steps leading up to which is a marble slab concealing the entrance to the tomb in which Cardinal Lavigerie desires to be interred. The inscription on the stone is in Latin, and reads as follows:

Here rests in peace,
In the hope of infinite mercy,
He who was
Charles Martial Allemand Lavigerie,
Cardinal priest of the Holy Roman Church,
Archbishop of Carthage and Algiers,
Primate of Africa,
And who now is but dust.
Pray for him.

The spectacle inside the cathedral during the ceremony of consecration was most picturesque, The foreign consular corps at Tunis and the officers of the French garrison, in their gold-laced uniforms, the gorgeous vestments of the prelates, the flowing robes of the native dignitaries who had assembled to witness the inauguration of the "new mosque to the Prophet Jesus," and white cowls and red fezzes of the monks of St. Charles — an order founded by the Cardinal for missionary work in Africa — all contributed to render the spectacle one never to be forgotten. Equally memorable was the sermon preached from the altar steps by the venerable Cardinal, which was brought to a close with the following words, delivered in tones of impassioned eloquence: "And now, bells of our cathedral, announce the birth of a new

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Carthage. Ring forth from to-day nothing but resurrection and life. Speak to these people who environ you nothing but of peace, concord and brotherly love. And declare to the world that if the priests of pagan Rome were brought here in times of old to curse, the priests of Christian Rome have come only to bless Carthage and poor Africa." — *N. Y. Tribune.*

Discovery of an Etruscan City. — The *Perseveranza* of Milan reports the accidental discovery of the remains of an Etruscan city near Marzabotto, in the district Vergato, province of Bologna. According to the statement of Professor Brizio, the city was divided, first, into four quarters, by two main streets 15 metres broad, which followed the cardinal points of the compass, intersecting in the middle. Two other streets of the same width, running from east to west, divided these four quarters into eight equal parts, and these again were crossed by parallel streets 5 metres wide. The house blocks thus formed are, with one exception each 165 metres long and 35–40 metres broad — one block only is as much as 68 metres broad. The main streets have two sidewalks, each 5 metres wide, between which lies the carriage-road, of the same width. The gutters, which run along the walks on the side next the houses, with a regular incline, measure 80 centimetres in diameter. The Etruscan houses which have been excavated already are arranged like the Roman, and are surrounded by shops. One of them, with a frontage of 35 metres, possesses a spacious vestibule, 5 by 7 metres, paved with mosaics. Though this, one passes into an *atrium* 26 by 10 metres, which is also paved with mosaics, and shows an *impluvium*. From the *atrium* open the sleeping-rooms, which measure 6.80 square metres, and a larger room, entirely open on one side, which was probably the *tablinum*, or room of the master of the house. The extreme regularity which characterizes the arrangement of this city leads to the conclusion that it did not grow gradually but was built as a colony, with a definite plan and at one time. According to the objects discovered, especially the painted vases, and also the contents of the graves which have been opened, the construction of this Etruscan Pompeii would date from the second half of the fifth century (?) B. C. — *Berliner Philologische Wochenschrift.*

Russian Architecture. — Notice the peculiarities of the architecture, the most salient feature of which, aside from gilded domes, is its bigness. Indeed, the houses could not be bigger had they been designed by an American pork millionaire. For example, I saw one whole street, every house of which occupied an entire block, while a little further on the Admiralty building, extending half a mile in length, recalled the boldness of the architects of Nineveh. It is, however, a successful experiment, and the grace of its symmetry and proportion relieves it of all awkwardness. In style the Classic Renaissance is everywhere steadily adhered to, although its purity is occasionally impaired by the introduction of Gothic vegetable forms in decoration; but the true splendor and magnificence of Russian architecture must be sought for in the interiors. This I discovered a little later while dining with a young officer of the Imperial Guard, whose dining-room may be taken as a convenient standard. One end of this apartment was occupied entirely by a porphyry fish-pond, the contents having been brought from the Volga. While eating our soup we pointed out the most desirable fish, and this was immediately caught by a tall "mujik," and in a few minutes lay smoking on the table. This luxury was not peculiar to my particular Slavic Lucullus, as every one who has visited Russia well knows, but I must confess my occidental imagination received a slight shock as, glancing up from the mosaic floor, my eyes encountered the legendary history of the family in sculptured bas-relief worthy of Thorwalsden, extending the entire length of the room, and punctuated by pilasters of malachite 20 feet high, the capitals of gold supporting a ceiling by Makowski, while the ribs enclosing the frescos and forming a groin were also of the precious metal. The rest of the appointments were as costly and magnificent in their way, but these would come under the head of decorative art rather than architecture. All this splendor seems less pretentious and more natural when one bears in mind the average wealth of a Russian noble, 50,000 acres of cultivated land not being considered particularly opulent; indeed my genial host, after the requisite amount of hesitation exacted by modesty and good taste, informed me that he possessed 250,000 acres. And yet private expenditure is as nothing compared to ecclesiastical, as in the case of the old Church of Kazan, where are jasper columns and an altar of solid silver, weighing seven tons. — *Boston Herald.*

Algerian Mosques. — Of the more than one hundred mosques which formerly existed in the city of Algiers, only five now remain. The most interesting of these are Djamäa el-Kebir, the grand mosque, in Rue de la Marine, Djamäa el-Djedid, or the Fisher Place mosque, also in the Rue de la Marine, and the enchanting little mosque of Djamäa Sidi Rhaman, overlooking the garden of Marengo, and taking its name from the marabout, or Mahometan priest of most venerated memory, Sidi Abd-el-Rhaman, who died in 1471 and is interred here within an inner sacred chapel or khouba, surrounded by several pachas and deys. Two distinct and zealous sects, the Maleki rite and the Hanefi rite, worship respectively at the Grand mosque and the Fisher Place mosque; while at the Sidi mosque all are on common ground; it is the shrine of the more aristocratic Moslems; and on certain days of the week it is thronged with men and women, the latter, from an old and lax custom, predominating. Indeed, it is at this little mosque, if reverence is assumed and discretion exercised, that one will secure more glimpses of Arab women of the finer type than offered by all other possible opportunities in Algiers. The Grand mosque dates from the eleventh century. From the Rue de la Marine it presents a façade of splendid white marble columns. These support an arcade, in the centre of which is a tremendous fountain. Before all mosques stands the fountain, for all Moslems perform extraordinary ablutions before entering for worship. The interior, as with all mosques, is extremely plain. Stately, monumental pillars, supporting the universal Moresque arch, provide numerous series of arcades. A few inexpensive lamps are supported from the roof. The pulpit is plain, and the gallery attached to it is of the severest pattern. A little niche, without ornamentation, is set into the wall, called the mihrab, which is found in all mosques, and indicates the east, the direction of the sacred Mecca. Mattings are hung about all columns and the side walls, lest they suffer defilement at the touch of sacrilegious Christian. The one sumptuous thing to be seen is in carpeting. The floor is completely covered with the richest of old Moorish carpets. For no Moslem, and no Christian unless he have no sense of regard for cherished religious custom and tradition, will ever enter one of these edifices without first removing his sandals or shoes. The windows are invariably small, set high in the walls, colored, and the effect of the dim, subdued light and the peculiar eastern incense, is exceedingly impressive. Under the same roof is the highest Algerian court of the Algerian Mussulmans, the superior tribunal of the muphti, to which appeals are frequently taken from the lower court of the cadi; for it has been the wise policy of the French provincial rule in Algeria, to foster and preserve all Mohammedan customs, religion and institutions, not positively inimical to French civil law. — *Commercial Advertiser.*

TRADE SURVEYS

So far as reliable advices have been received during the past thirty days from leading architects, builders and contractors in the largest cities of the country, it appears that lost time is being made up, that confidence is generally restored, and that preparations are now in a forward state for very active building operations during the remainder of the year. An enormous amount of building will be done. The manufacturers of building material are under contract to supply as much material as they will be able to turn out until the close of the year. The brick-makers in all sections, but particularly in the far West and South, have contracts either already in hand, or assured, which enable them to keep their full capacity engaged. The lumber manufacturers feel confident that their entire product will be promptly marketed, and at slightly higher prices than prevailed a year ago. About the only difference in the lumber trade to-day, as compared to this time a year ago, is that sellers now have the advantage of a somewhat better demand, and prices are, therefore, more regular. A year ago, a large amount of lumber was being sold very close to cost price; but now comparatively little is sold on such terms. The demand for all kinds of hardwood, especially Southern, has greatly increased, and the saw-mills in the interior of the South have their fullest output for some time to come, already under contract. The hardwoods of the North are also in better demand. In fact, as several architects have stated, there is a general increase in the demand for hardwoods for interior finish and general use. The white-pine manufacturers are having a better year than they expected. The manufacturers of spruce are selling their product at higher prices than last year; hemlock is also bringing more. Walnut sells well for export; poplar rules strong in all markets, and the demand is heavy. Quartered-oak sells as fast as it can be delivered. The entire lumber market is in good shape. The latest statement with reference to the iron industry is that the weekly output of crude-iron, amounting to 180,000 tons, is all going into consumption, and that a large number of large and well equipped new furnaces will be put in operation before the close of the year. Between forty and fifty new blast-furnaces have been projected within a few months. A vast amount of mineral property in the South is being picked up by American, as well as foreign capitalists. If one-fourth of the new enterprises now talked of are pushed to completion, the lumber manufacturing and iron and steel-making capacity of the country will be increased to an extraordinary degree within the coming twelve months. The outlay now being made in reproductive channels is greater than at any previous time. That these investments are wise and safe is for no one at present to doubt. The agricultural and manufacturing interests maintain an even balance. The decentralization of industries now in progress, is the strongest assurance that the existing prosperity and activity will continue.

If the Northwest was exclusively a wheat-growing region, if the South produced only cotton, serious evils might well be anticipated; but with manufactures of a hundred kinds springing up and flourishing in these agricultural regions, creating little markets within sight of farms and plantations, there is no reasonable cause for apprehension that production and consumption will become unbalanced. Investments of foreign capital continue of large proportions. It is estimated that British capitalists now control not less than 21,000,000 acres of valuable and carefully-selected lands in this country. Estimates of the amount of foreign capital invested in manufacturing plants in the United States vary widely, and at present no approximately correct figures can be given. The tendency to invest in American properties seems to be on the increase. The valuable lands of the Southern States are rapidly passing out of the hands of their original holders into the possession of second, third or fourth parties. The real magnitude of the field for profit-making in the South is only beginning to be appreciated. Within the past three months, several railroad-building schemes have been formulated, contemplating the construction of lines of road between Chicago and South Atlantic and Gulf coasts; the lands through which these lines are to pass will rapidly increase in value. The railroad companies of the country are doing from 10 to 15 per cent more business than last year. The output of the small shops is safely estimated to be 10 to 20 per cent in excess of last year. Coal production will show an increase of 10 per cent, and the coke production will be much greater. So far, the Pennsylvania coke production alone shows a gain of 456,683 tons, as compared to the corresponding time last year. The production of soft coal shows a heavy increase, the figures for the Allegheny Mountain region of Pennsylvania showing, so far this year, an excess of 1,220,000 tons over last year to the same date. This rate of increase is not maintained in all sections of the West, but there has been a decided gain. A veritable building boom has set in at Chicago, due mainly to the projected Columbian Exposition. In Minneapolis, Duluth and other cities of the far Northwest, and in Denver and several other Western cities, the activity which set in early in the spring has been rapidly increasing; nor is it altogether speculative. The investments made are not merely those brought about by loans of Eastern capital, but are the result of the accumulations of the people themselves. The building and loan associations are everywhere prospering. Latest published reports show a steady gain in membership, in the Western States especially. Labor organizations are also steadily gaining in strength.

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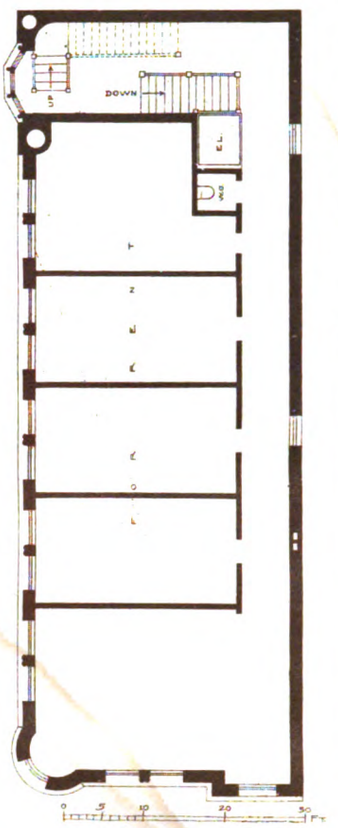

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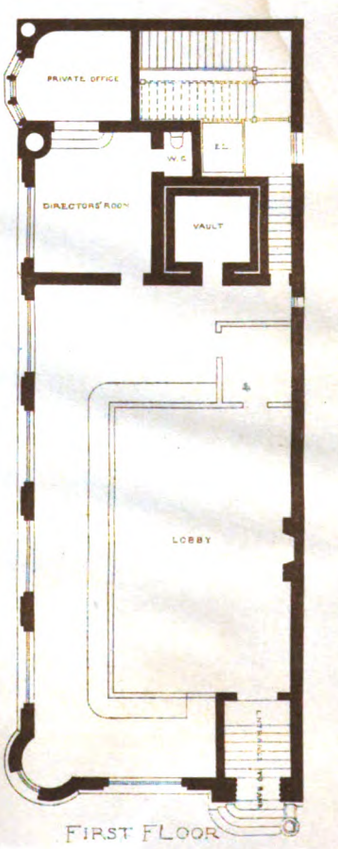

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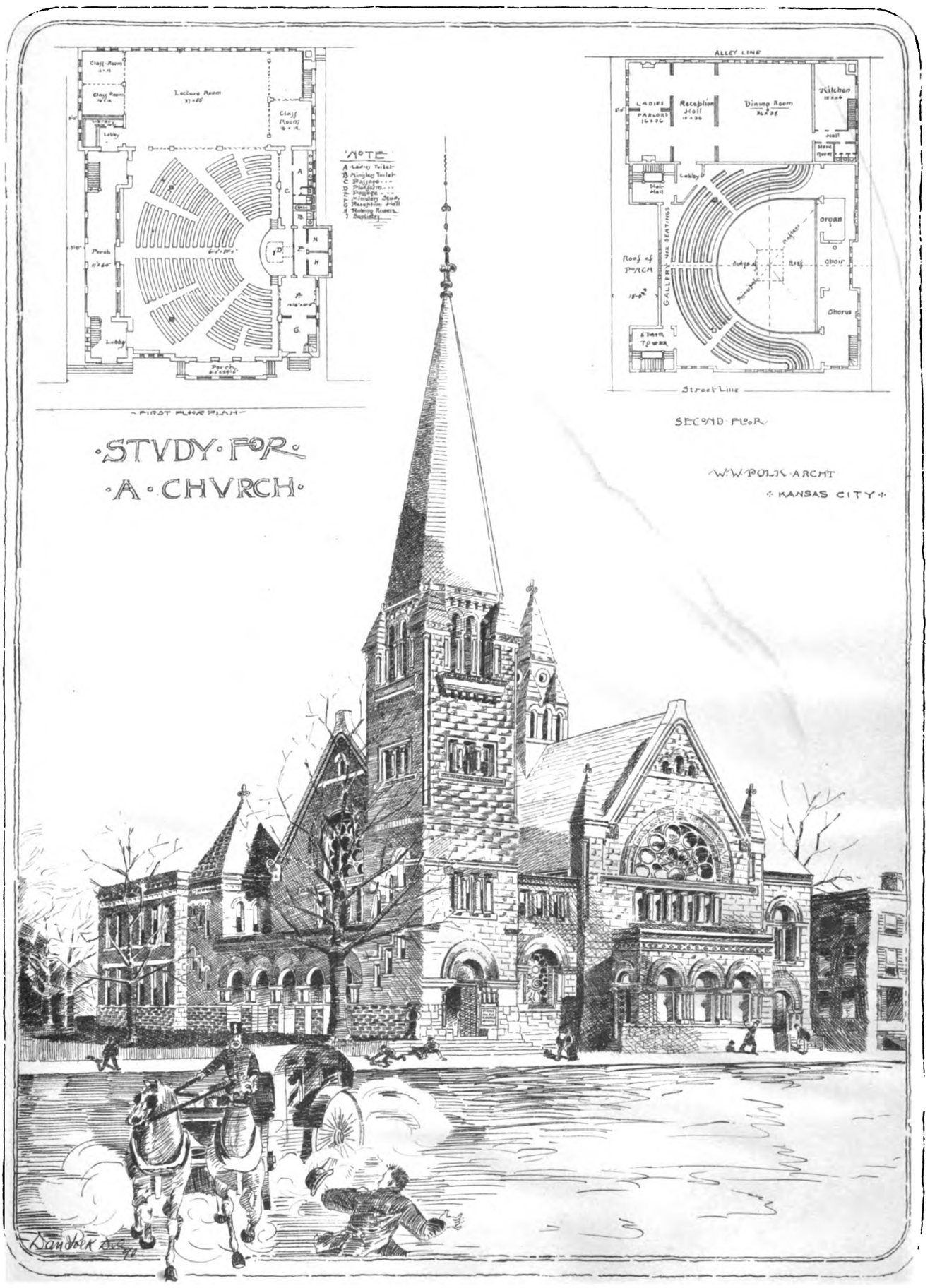

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ODD FELLOWS BUILDING
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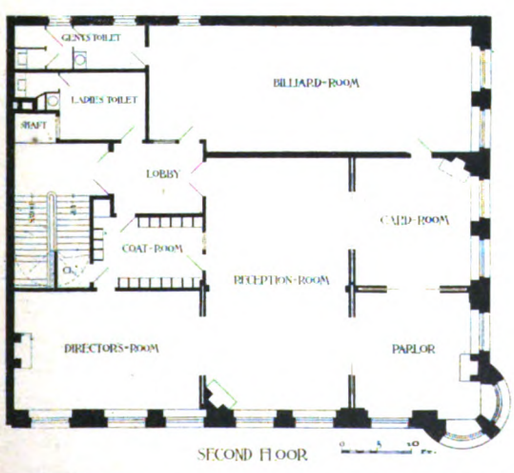

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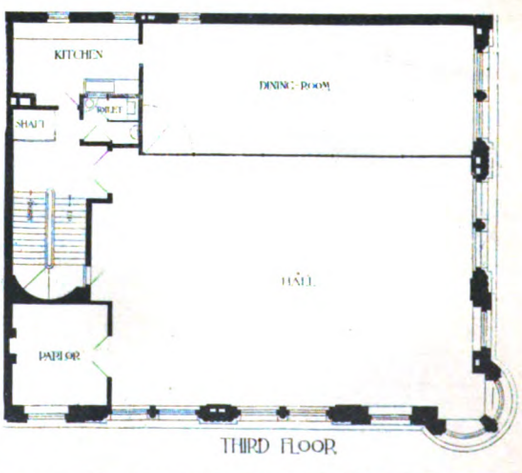

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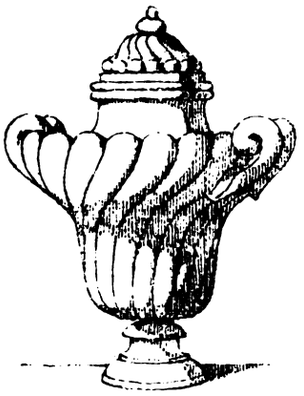
Edgar A. Josselyn

Candle bracket.

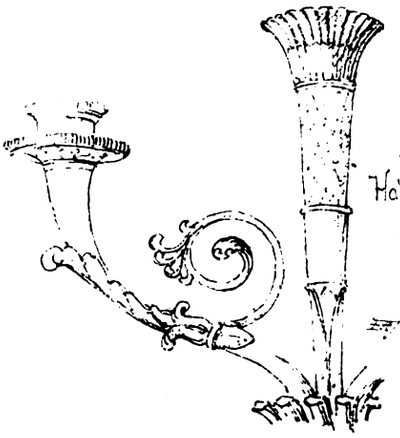
Fountain base.



Louvre

Jan. 14. '88.

Red marble Tripod - Galerie d'Apollon.

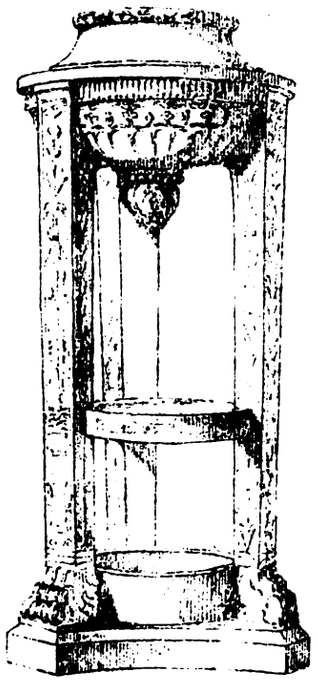


Half circle of four arms.

SKETCHES BY A ROTCH TRAVELLING-SCHOLAR.

Roman Tripod.

White marble.



Louvre. Oct 25. '87.

Louvre

Oct 10 '87

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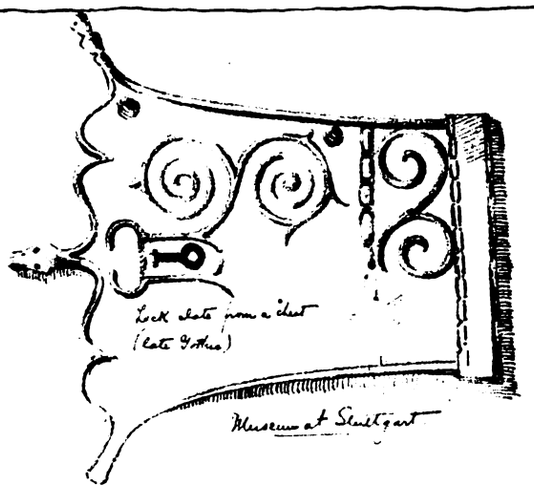
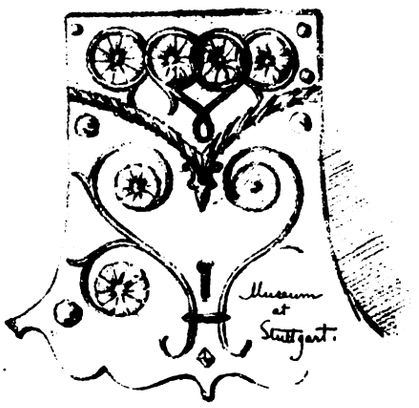
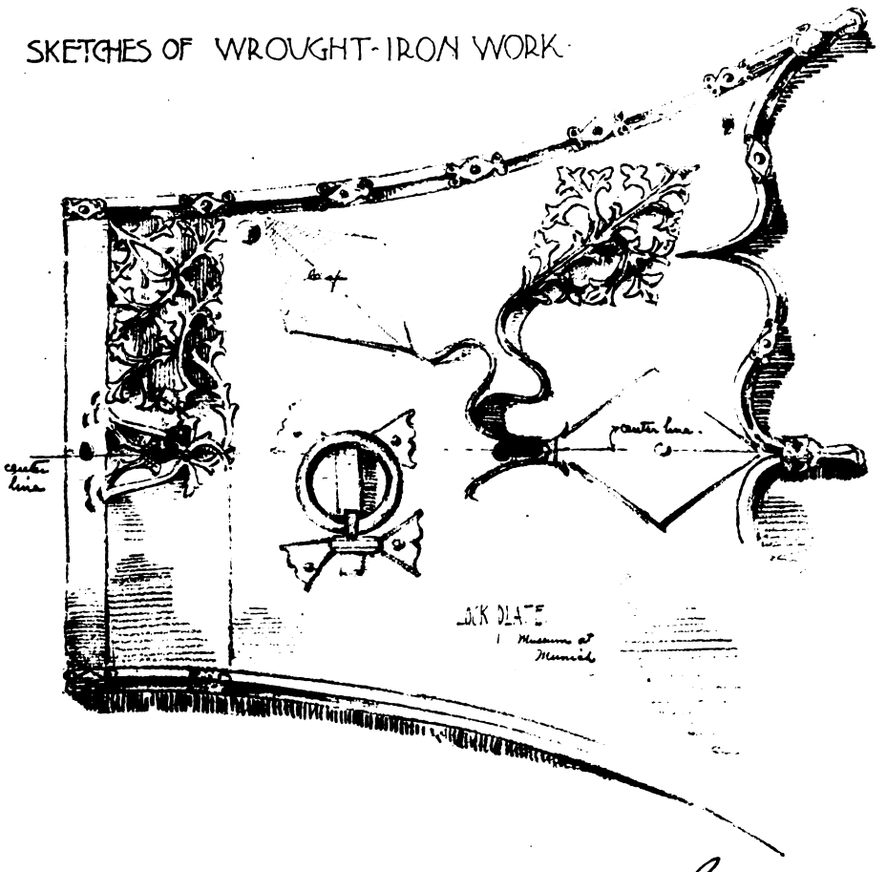


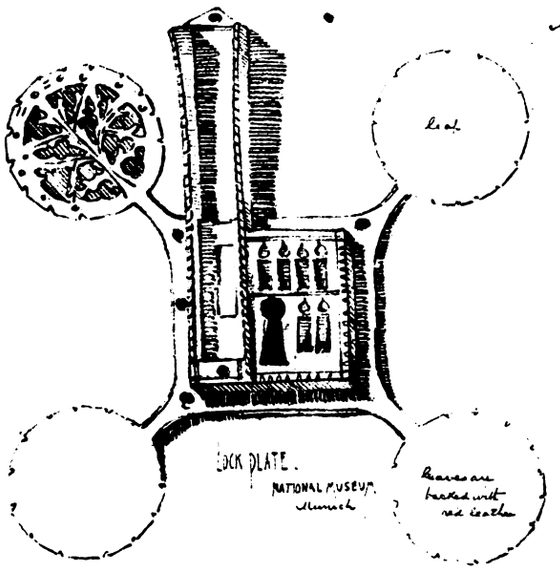


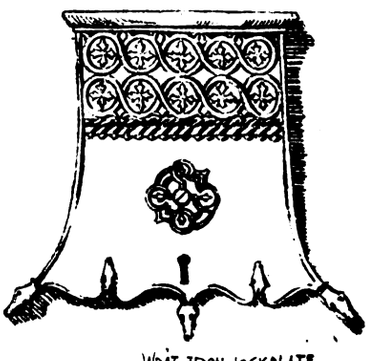
SKETCHES OF WROUGHT-IRON WORK.



Theo. F. Laist

[AMERICAN ARCHITECT TRAVELLING SCHOLAR.]





WROT IRON LOCKPLATE
Museum of Stuttgart.

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THE AMERICAN ARCHITECT AND BUILDING NEWS.

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JUNE 28, 1890.

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WE print in another column a communication from the Indianapolis Chapter of the American Institute of Architects, on the death of Mr. D. A. Bohlen, a Fellow of the Institute, and for two years President of the Indianapolis Chapter. Mr. Bohlen's reputation among architects was by no means confined to his friends in Indiana, and his death will be greatly regretted in the profession.

THE *Cosmopolitan Magazine* some time ago offered prizes for the best designs for a bath-house and a public laundry, with the idea that if suitable plans were obtained, an association would be organized to carry them out, for the benefit of the poorer people in New York. The award was made a few days ago, by a jury of expert architects, the prize for designs for baths being given to Mr. John G. Howard, and that for the best laundry plan to Mr. Lyman A. Ford, of Boston. It is intended to make the arrangements for bathing so simple that a warm bath can be given, with appliances of soap and towel, for not more than seven cents, and it is hoped that the cost can be reduced to five cents. In Frankfort-on-the-Main a warm shower-bath, with a clean towel and a bit of soap, can be had for three cents, and there is no reason why the cost in New York should be much greater. In the Frankfort baths there is no swimming tank, and it would seem as if the public swimming baths on the river fronts would give sufficient advantages of this kind during the summer, which is the only season when swimming baths would be used by poor people; but a dozen or more of compact, well-warmed shower-bath establishments, kept neat and clean, where men and women could wash themselves comfortably and thoroughly for the price of a newspaper, would do an immense amount of good in the city.

THE movement for forming coöperative associations, with which the striking carpenters in Boston have been amusing themselves during their forced idleness, seems to have made an impression on the men which we hope may be permanent. Two such associations have already been formed, one of which reports that "many real-estate owners, architects and business people are as willing to entrust the construction of buildings to a coöperative concern, formed of practical workmen, as they are to trust the work to a contractor." The truth of this piece of information, which any architect could have imparted to persons interested at any time, is obvious. Of the two, most architects would rather give a contract to a coöperative association of good workmen than to a contractor, for the reason that the latter, even if his intentions are good, cannot look after all his men all the time, and the latter, having no particular interest in the work, and, very likely, never having seen the drawings or specifications, make blunders, and waste time and materials, in a way which would be impossible with an intelligent coöperative society, where each man would take pains to ascertain what was to be done, and would not only do his part to have the work go quickly and correctly, but would be on the lookout to see that none of the other men injured the general interest by carelessness. As to the consideration, moreover, which, as is commonly supposed, would weigh most seriously with architects in preferring regular contractors to coöperative associations in awarding contracts — the probability that the latter would have less capital, and would, therefore, be financially less responsible — we are inclined to think that, for ordinary work, this would be of little or no importance. Many a builder, as architects know, does a considerable business on a capital of five or six hundred dollars; and one that is known to be honest, so that the dealers in materials will trust him, can almost always have his contracts so arranged that, while the interests of the owner are protected, his own, if he intends to carry out his contract fairly, will be equally so. With the coöperative societies, a contribution of a week's wages from each member, with a willingness to wait a little while, in case of need, for a portion of his regular income, would constitute capital enough for all the business that such a society ought, in the present state of the law, to undertake, and a coöperative society with a good reputation for efficiency and honesty could have from the architects' offices all the business it wanted on those terms, if it could be relied upon to carry out faithfully the contracts which were awarded to it. The really important consideration, which would weigh far more with architects than any fears of the insufficiency of their capital, would be the apprehension that the coöperative societies would be less inclined than a contractor to carry out their agreements to the letter. It has suited the purpose of the cheap politicians to treat men who work with their hands as well as their heads as a body of interesting infants, whose main duty in life was to vote for the politicians in question, and who, if it proved inconvenient to pay for what they bought, or to do what they agreed to do, or look out for their precious skins in the same way as other people, had only to come howling to the Legislature to be relieved of their obligations, furnished with money which did not belong to them, and authorized to collect damages from all sorts of innocent people for the results of their own carelessness. This has resulted in making of the ordinary workman a being whose idea of fulfilling his promises, if he takes a fancy not to do so, is very imperfectly developed. Every architect hears of innumerable instances where journeymen, after being engaged, and promising to come with their tools to the building on a certain day, fail to appear at all, often to the serious loss of owners as well as contractors. It is not too much to say that no man, and no coöperative society to which any man belonged, who has been known to an architect to fail in keeping such an appointment, would ever get a contract from that architect's office; yet, according to our experience, at least one-half of the city journeymen carpenters think nothing of agreeing to go to work for a certain employer on a certain day, and failing to appear at all. Such a manner of treating obligations is, to architects, the unpardonable sin; and the new coöperative societies must cultivate with the greatest care an exact performance of every promise, however trivial it may seem to them, which they make in the line of their work. This habit once acquired, they may be sure of the success which we sincerely wish for them. That uniform good fortune, even if they deserve it, awaits them in this wicked world, we cannot expect. Business traditions do not change quickly, nor are the experience and caution which will prevent losses very readily acquired, while there will be plenty of rascals to prey upon the honest workingmen in their new relations; but patience and perseverance, with thought and study on the part of the more intelligent, will gradually remove the obstacles to what we believe will be the great industrial movement of the future.

A DECIDED novelty in specifications has been introduced by a Philadelphia architect, Mr. I. F. Stuckert, who has, by so doing, called forth the enthusiastic praises of the local contractors. It seems that Mr. Stuckert, having to draw

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up specifications for a factory, inserted in them a clause which excluded all contractors from outside the limits of Philadelphia "from offering estimates." According to the local contractors, this is an admirable instance of the application of the principle of protection for home industry to the building trades. They complain that, under the ordinary system, people from outside the city, whose men "work longer hours, and are paid less wages" than Philadelphia workmen, come in and estimate on buildings, and, being able to "quote lower figures," they secure more contracts, so that it is said that two-thirds of the building mill-work in Philadelphia is done by firms outside the city; and they hope that all the architects will follow Mr. Stuckert's example. Desirable as it may be to protect the Philadelphia wood-workers, we venture to say that the end will not be brought about by the intervention of the architects. The fact that the latter are employed, not by the contractors, but by building-owners, and that their duty is to get the latter's work done wherever and however it can be done best and cheapest, without regard to the interests or sentiments of anybody else, seems never to have occurred to the Philadelphia builders, and it would do them no harm to have their minds set right on the subject.

MR. MULLETT, formerly the Supervising Architect of the Treasury Department, as our readers are aware, sued the Government some time ago for special compensation for his services in designing the building of the State, War and Navy Departments in Washington. It was not very clear why he should consider his work on this building outside of his regular employment as a salaried officer of the Government, and the Supreme Court has now decided that he has no claim to special compensation in the case. While the decision of the Court is undoubtedly well founded, we sympathize entirely with the Cincinnati *Enquirer*, which says that future generations will find it hard to believe that the man who designed and carried out this, as well as many other of the largest and most costly public buildings on the continent "got no more salary all the time he was doing it than if he had been a bookkeeper, or kept a cigar stand." "If his style of architecture was not up to everybody's standard," the *Enquirer* goes on to say, "it was not his fault that the Government employed him"; and he was certainly an energetic, industrious and intelligent official, who carried out a very great and necessary work for the Government in a reasonably acceptable manner, and deserves something better than to be left in his old age, as he is said to be, "poor, embarrassed and out of heart."

THE people of San Francisco are being entertained with one of the pieces of scandal which seems inseparable from the construction of a public building, and which, this time, relates to their City-hall. We cannot say that we pity them much, the history of their relations with their architects being by no means an edifying one. Quite recently, a new architect was appointed to inquire into the manner in which the contract work had been performed. He began by making forty-three holes in the walls and piers, and found, in about one-fourth of the places, that the interior of the masonry was filled with rubbish. The contractors, very properly, agreed to rebuild the defective work, and claim to have positive information that the rubbish was purposely put in by one of the workmen, who, when the proper time came, informed the City-hall Commissioners that there was bad work in the building, and put it into their heads to have the masonry tested. Several other workmen are said to have testified that this ingenious person told them what he had done, and said that he expected to make a good deal of money out of the affair. Without knowing anything of the character of the contractors, we think it quite likely that their explanation is the correct one, and that the bad work was done without their knowledge, and perhaps with the express purpose of injuring them. If so, it would be by no means the first instance of the kind. We remember a case, several years ago, where there was considerable public excitement over some rascally work done in a public building. An investigation was held, and the person who first brought the information which led to the investigation was put on the witness-stand, and coolly testified that he knew that the work was improperly done, because he was at that time employed in the building, and did it himself! Of course, in such cases the owners make the contractor, or, preferably, the architect, pay for pulling out and rebuilding the portions of the structure on which the facetious workman was employed, while the latter, having no money to lose, draws his two dollars a day in witness-fees for testifying to his own rascality, and thinks himself one of the most ingenious and eminent of mankind.

MR. A. LASENBY LIBERTY recently read a paper before the English Society of Arts, about Japanese workmanship, which, as he thinks, is very far from the stage of slavish imitation of European models to which most people imagine that it has descended. No doubt the necessity for catering to the coarse, cheap European taste has corrupted the manufacture of many Japanese objects, but the whole attitude of a Japanese in relation to his work is completely different from that of a civilized workman as can be imagined. "With the Japanese," says Mr. Liberty, "carpentry is a fine art." We all know the accuracy and perfection of their joints and fitting, but every one does not appreciate the artistic instinct which goes with the skill of hand. Among the objects which Mr. Liberty showed to illustrate his lecture was a beautiful inlaid box, of which he related the history. The foundation of the box was an old rectangular rice-measure, such as is used by Government officials, with its upper rim covered with iron. About three-quarters of the iron was worn away, when the measure came into the workman's hands. Instead of tearing off the remainder, as any civilized joiner would have done, so as to reduce it to uniformity, he looked at the fragment of rusty metal as a picturesque decoration, and left it carefully in place, cutting out the substance of the new lid which he added, so as to fit exactly over the ragged bit of metal. Then, turning the box over, he found a half-obliterated Government stamp on one side. This, instead of being planed out, was utilized as a decorative feature, and surrounded by inlays of ivory, pearl, bronze and amber, which, extending to the other sides, produced a complete and artistic work.

A VERY curious table has been drawn up by the Labor Commissioner of Wisconsin, showing the rates of wages per hour paid in thirty-eight of the principal cities in the United States in the main building trades. If the table is accurate, the variations are surprising, and, what is still more surprising, they seem to follow no rule. For example, it is commonly supposed that workmen's wages are the highest where their labor is most in demand. According to this theory, the rates should be highest, perhaps, in the cities of the New South, where buildings are being hurried up in every direction; yet in Atlanta, one of the most flourishing of the new Southern towns, masons' labor brings twenty-one and four-tenths cents per hour, the lowest rate paid in any city in the United States, while common laborers get only seven and one-half cents per hour. In regard to the latter, it will be said at once that the Atlanta laborers are negroes, whose inferior intelligence makes their work worth less than that of the whites; but in Galveston, Texas, the laborers are also negroes, yet they get twenty cents an hour, the highest rate reported anywhere. Curiously enough, in St. Louis, an old and steady-going Southern city, masons get forty-nine cents an hour, or more than twice as much as is paid in bustling Atlanta. Roofers, also, get only one-half as much in Atlanta as in Sante Fé, and little more than half as much as in Brooklyn, N. Y. In Minneapolis and St. Paul, also places of very active building, masons get only thirty-one cents an hour, against nearly forty-one in New York. Carpenters get the highest pay in San Francisco, thirty-nine cents an hour; and the lowest in Lexington, Virginia, where the rate is eighteen and one-third cents an hour. Plumbers are best paid in Wilmington, Delaware, and worst in Vicksburg, Mississippi. Even between New York and Brooklyn there is an appreciable difference, laborers getting nineteen cents in Brooklyn, or very nearly as much as in Galveston, and less than seventeen in New York. On the whole, the figures seem to indicate that the rate of wages is a local and temporary matter. Atlanta, within two or three years, has been busily engaged in building, and architects, and probably building workmen, have gone there to profit by the rush of business. The consequence has apparently been that the market is overstocked, and the men have to take what wages they can get. That Galveston, which is similarly situated, should pay nearly the highest wages in the country seems to indicate a growing prosperity, which has not yet been so extensively advertised as to attract migration from outside.

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RELIGIOUS ARCHITECTURE.[1] — XII.

VII. BYZANTINE ARCHITECTURE IN THE EAST.

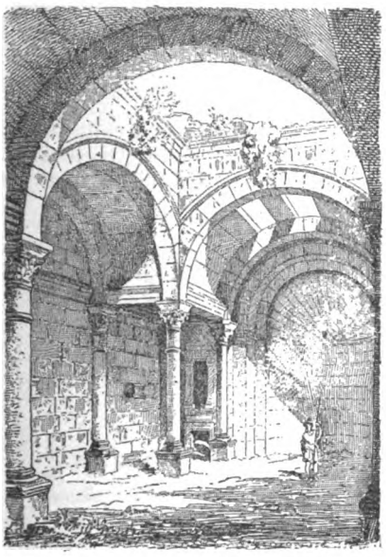

Fig. 1. Ruins of the Prætorium of the Mousmieh Basilica (2d Century). After M. de Vogüé.

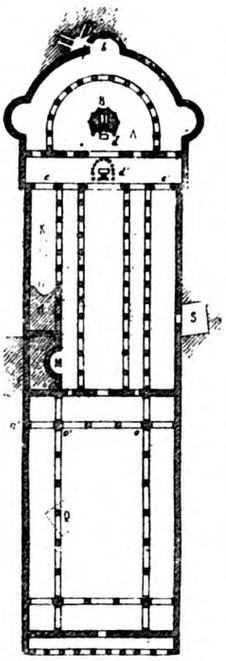

Fig. 2. Plan of the Basilica of the Holy Sepulchre, at Jerusalem (4th Century). Scale 0.001.

HAVING indicated the sources from which Byzantine architecture was derived, on the one hand, its appropriations from Roman antiquity, with modifications to suit the designs to the requirements of the new worship, and, on the other, its purely original elements, we will describe in separate sections its development in Asia Minor and Eastern Europe, and its influence on the architecture of Western Europe, showing at the same time what traces are left of this influence.

Constantine reared a large number of churches in Greece, which have disappeared. Those which we have already had occasion to notice are of much later date than this emperor's reign. The total destruction of these edifices is all the more to be regretted, because they would apparently have furnished us examples of domes on pendentives, anterior to the St. Sophia of Justinian. There would have been nothing surprising in this, for it is not to be supposed that such an advanced and bold disposition was conceived outright by Anthemius and Isodorus; before having been applied to such a vast structure, it must have been tried on a smaller scale.

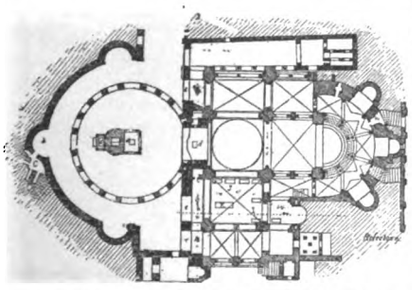

Fig. 3. Plan of the Church of the Holy Sepulchre, at Jerusalem (7th Century).

Syria proper offered a rich harvest to archæologists; numerous structures belonging to the Byzantine period have been discovered there, which illustrate perfectly the plans and decorative character of that epoch of Syrian architecture.

The history of Syrian architecture does not apparently go back of the first century of the Christian era. It seems to have originated with a singular document found at Quennauât, and which proved to be a decree of King Agrippa inviting the inhabitants of the region to abandon their barbarous traditions and adopt the customs of civilized life; and, in fact, great building activity was displayed throughout the country from the first century A. D. In the second century, the Roman Imperial Government ordered the erection there of palaces, baths, temples, aqueducts and triumphal arches. The movement went forward under the Christian emperors. The pagan sanctuaries were converted into Christian churches, and at the same time a large number of freshly-constructed edifices were consecrated to the new faith. However, it was especially from contemporary Greek art that the inspiration of this civilization was most directly drawn, during the Christian as well as the Roman period; in the same way, the new church borrowed its liturgy and the nomenclature of its hierarchy from Greek sources.

In visiting to-day those deserted streets, says M. de Vogüé, those abandoned courts, those porticos with vines twining about their mutilated columns, one is impressed much as he is at Pompeii, though less distinctly, perhaps, as the Syrian climate has not preserved its treasures as the ashes of Vesuvius have preserved theirs; there is more novelty, however, in the lessons taught by the Syrian ruins, for far less is known of

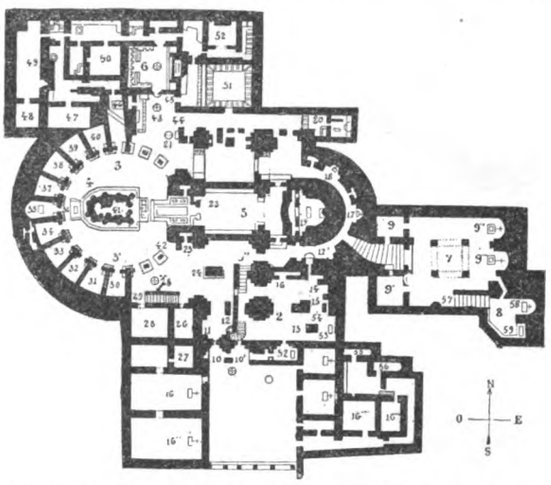

Fig. 4. Plan of the Church of the Holy Sepulchre (present condition). — 1. Entrance Court; 2. Chapel of Calvary; 3, 3′. Great Dome; 4. Chapel of the Holy Sepulchre; 5. Greek Church; 6. Church of the Latin Franciscans; 7. Chapel of St. Helena; 8. Chapel of the Cross; 27. Ruined steeple; 10. Entrance to the Church of the Holy Sepulchre; 10′. Walled-up door; 11. Divan for the Turkish Guards; 12. Stairway belonging to the Latins, and leading to the Chapel of Calvary; 3″. The Greeks' stairway; 13. Spot where Christ was crucified; 14. Greek altar, showing the hole made by the cross; 15. Fissure in the rock; 16, 16′, 16″, 16‴. Greek Chapels; 17. Parting of the garments; 17′. Crown of Thorns; 24. Anointing Stone; 25. Position of the three Marys; 9, 9′, 9″, 9‴, 26, 28 and 42. Stairway and American Chapels; 44, 46, 47, 48, 49, 50, 51, 52, 53, 54. Latin Chapels or dependencies of the Latin Convent; 41. Chapel of the Angel; 36. Coptic Chapel; 35. Chapel of the Schismatic Sovereigns; 30, 31, 32, 33, 34, 37, 38, 39, 40. Greek, Armenian and Coptic Chapels; 45. Stairway of the Latin Church; 43. Place where Mary Magdalene remained; 21. Spot where Christ appeared to her; 20. Christ's prison; 57. Stairway leading to the Chapel of the Cross; 59. Place where the Cross was found; 22. Centre of the world: The Greek Holy of Holies; 18. Chapel of Longinus; 55. Place of Abraham's Sacrifice; 56. Place where Melchisedec blessed the wine.

the civilization reflected in them than of that of the Augustan age. In fact, these cities, numbering together more than a hundred in a distance of thirty or forty leagues, form a whole from which it is impossible to detach anything individual; all is bound and linked in one, all belong to the same style, to the same system, to the same epoch, in short; and this epoch, that of primitive Christianity, is, up to the present, the least known as

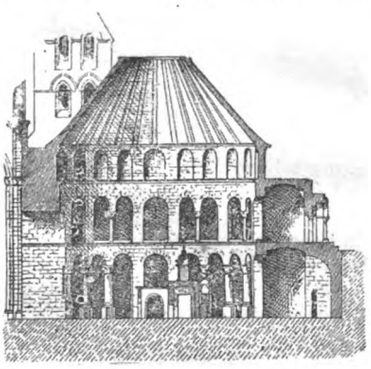

Fig. 5. Section of the Church of the Holy Sepulchre (7th Century).

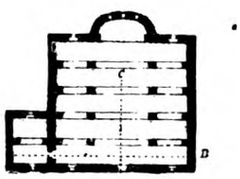

Fig. 6. Plan of the Basilica of Tafkha (4th-5th Century).

regards art; it extends from the fourth to the seventh century. These Syrian structures transport us, then, into the very centre of Christian society; we detect in them its life — not a life hidden in the catacombs, not the humiliated, timid, suffering existence which is generally pictured to us, but a broad, rich, artistic life; life in spacious, well-arranged dwellings built of massive cut stone, adorned with galleries and covered balconies, and

[1] From the French of P. Planat, in Planat's "*Encyclopédie de l'Architecture et de la Construction.*" Continued from page 177, No. 756.

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set in beautiful vine-planted gardens, with wine-presses and stone vintage-tubs and tuns; with extensive subterranean kitchens and stables for horses.[1] We find, also, beautiful squares bordered by porticos, elegant baths and magnificent, colonnaded churches, flanked with towers and surrounded by splendid tombs. Crosses and monograms of Christ are sculptured in relief over most of the doors; numerous inscriptions can be read on the monuments. . . . The choice of texts points to a period near that of the triumph of the Church; there is an accent of victory dominating every line of the inscriptions, from the verse from the Psalmist, graven in beautiful red characters on some richly-sculptured lintel, down to the *graffito* of an obscure artist, who, when decorating a tomb, tried his brush on the rock wall by inscribing the monogram of Christ, and, with the enthusiasm of a freed Christian, wrote beside his representation of the Christian standard, *Τοῦτο νίκᾳ* "This conquers!"

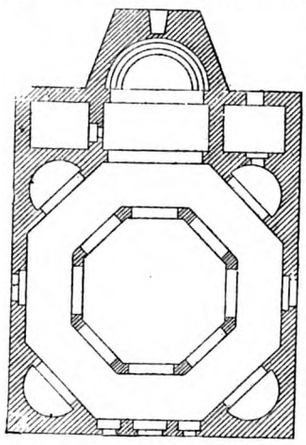

Fig. 7. Plan of the Church of Ezra (6th Century).

It was then essential that a study should be made of the remains of this region, in order to trace the history of Christian religious architecture; the study is of paramount interest still, in view of the unquestionable influence exercised by Oriental schools on the development of Occidental art in the Middle Ages. In the origin of this development Syria seems to have had an appreciable part, or, in more general language, the architectural school then flourishing throughout the East, and of which Syria has preserved the most varied and complete types.

As regards construction, it is certain that the typical Roman feature, namely, the building of huge barrel-vaults supported by networks of strong frames, forming compartments, the meshes of which were afterward filled by simple ornamentations, was carried down to mediæval times, when, by the invention of cross-ribs, half-ribs and diagonal ribs, the chief characteristic of the new style was evolved out of it. It would be difficult to deny that the transmission took place through the medium of the Eastern schools. The former basilicas of Tours, St. Denis and St. Gall, like those of Aix-la-Chapelle and S. Vitale, must have been built on the same principles that were adopted in Syria.

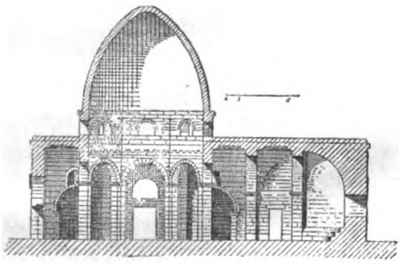

Fig. 8. Section of the Church of Ezra (6th Century).

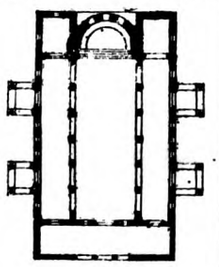

Fig. 9. Plan of the Basilica of Baquoza (6th Century).

So far as general dispositions and decorative style are concerned, and even in certain details of architectural ornamentation, the analogy can also be easily established. From the fifth century, the Syrian edifices had porticos with triangular pediments, apses with external rows of columns, and façades with towers, which were adopted later in Western religious architecture.

In consequence of the frequent and intimate relations already existing between the Eastern and Western divisions of the world, and while Western society was assimilating the invading barbarian element, a new art was struggling into existence, though taking as its basis the knowledge and experience acquired by the older civilizations. Europe submitted to, or rather, accepted the ascendency of Byzantine art for several centuries, until the moment when the Crusades established more perfect and more intimate relations still between East and West. Viollet-le-Duc went so far as to assume that after the taking of Antioch by the Crusaders (1098), during the first Crusade, and after it had become the capital of a French principality, which was maintained for a century later, learned men attached to the army fixed their residence there, and studied such Syrian monuments as those of Chagga in the Hauran; that they obtained from these the principle of groin-arches, as well as a system of vaulting, which they imported later into Provence and Languedoc.

In tracing the history of western European architecture, an examination of the Byzantine structures of the Orient affords an opportunity for useful comparisons, and furnishes some very valuable information; moreover, the Byzantine edifices of Asia, which have been investigated by a number of archæologists, and notably by M. de Vogüé,[2] exist in great number and in an unparalleled state of preservation. Hence the very peculiar interest which attaches to their study.

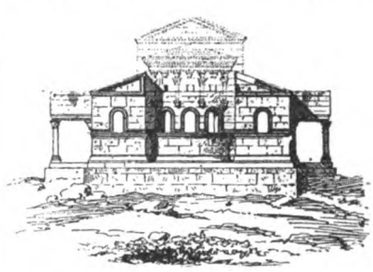

Fig. 10. Apse of the Church of Baquoza.

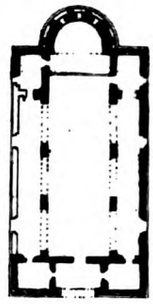

Fig. 11. Plan of the Church of Kalb Louzeh (6th Century).

There are sufficiently complete remains from even the Roman period to enable us to restore perfectly the prætorium of the ancient basilica, which has become the modern apse with all its variants.

The prætorium of Mousmieh, the ancient Phæna, was built (Figure 1) under the emperors Marcus Aurelius and Lucius Verus (160–169). It appears to have been modified later. The mode of construction consisted in the employment of arches, placed so near together that flat stones could be laid side by side from arch to arch. The central square was covered by a sort of cupola, made of rubble-work, which has fallen in. Here we have an example of one of the oft-recurring attempts to erect a dome on a square foundation, as also one of the earliest solutions of the problem.

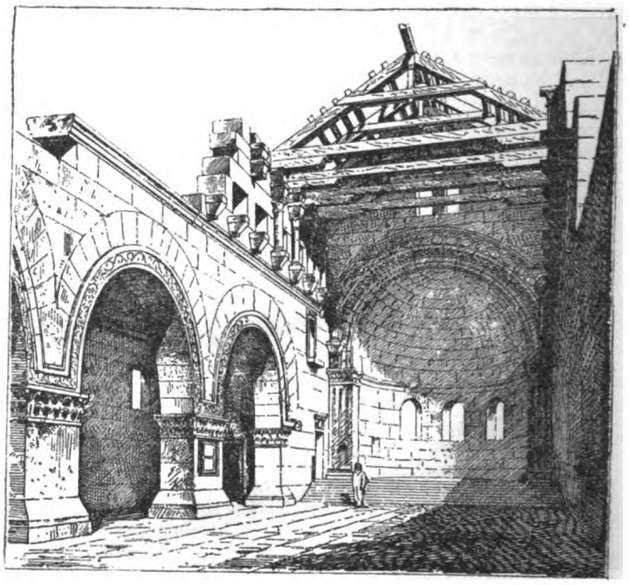

Fig. 12. Interior of the Church of Kalb Louzeh. After M. de Vogüé.

The prætorium of Phæna was afterward transformed into a Christian church. This led to certain changes which, in any case, are not later than the fourth century.

[1] See the edifices and dwellings of the Hauran, Safa, Djebel Riha and Tala. "*Architecture Civile et Religieuse de l'Asie Centrale*," by M. de Vogüé.

[2] See also: "*L'Arménie, la Perse et la Mésopotamie*," by Ch. Texier; "*Les monuments de la Perse*," by C. Coste. For Greece, see Couchand: "*Voyage en Grèce et églises Byzantines*"; Texier: "*L'Architecture Byzantine.*" See also M. Corroyer's excellent résumé: "*L'Architecture Romane.*"

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There are remains in Asia minor of especial interest for the history of art. In the foremost rank, we must cite the Holy Sepulchre (Figures 2, 3, 4, 5), which was erected at Jerusalem by Constantine and Helena, in 326, on the spot assigned by tradition to the tomb of Christ. In the seventh century, this church was devastated by the Persians; reared a second time by the monk Modestus, during the reign of Heraclius, it was again ravaged by the Arabs in 1010, on the orders of the Caliph Hakem, son of a Christian mother.[1] In 1048, it was rebuilt by Constantine Monomachus, and toward 1130, after the fall of Jerusalem, by the Crusaders.

Amid all these restorations, the primitive plan (Figure 2) has become curiously modified. The church was at first a basilica with five bays,[2] according to the restoration of M. de Vogüé, with an atrium in front, a transept, and an apse flanked by three small apses. The basilica was afterward converted into a circular church and was used as a model for several western churches. It was simply roofed with timber, in the form of a truncated cone, with a central opening, made directly above the spot reputed to have been the tomb of Christ, and designed to recall the Ascension. A modern cupola has superseded this wooden construction. Since the latest restorations, another apse has been added, facing the first; many subsidiary buildings have been annexed, as may be seen by referring to the plan given of the present edifice; these dependencies are all the more essential because the church is to-day devoted to several different cults, each of which has distinct quarters there.

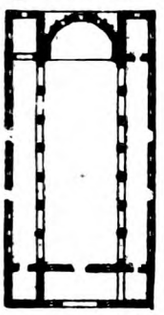

Fig. 13. Plan of the Church of Tourmanin (6th Century).

The basilica of Tafkha (Figure 6), which marks the transition from the civil basilica to the Christian church, presents, moreover, another peculiarity: the tower, which dates from the fourth century, is erected on one side; whether it served at that time for a bell-tower is a question that cannot be determined, although it is known that bells were in use as early as the fifth or sixth century. But as the important Roman dwellings were themselves provided with towers for watch and defence in times of danger, it is possible that this appended structure was at first only a survival of Roman tradition.

The three-aisled arrangement was adopted, as in the basilica of Mousmieh.

The church of Ezra, erected in 515 and preserved unaltered, is most interesting, because it exhibits in full the construction of a dome established on an octagonal plan (Figures 7, 8). The last course but one of the masonry consists of stone slabs

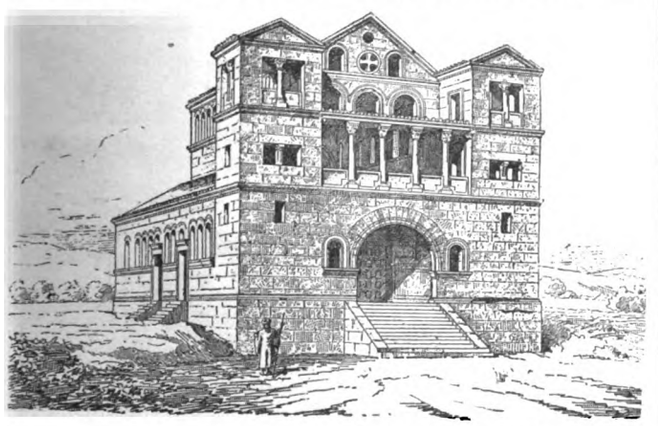

Fig. 14. View of the Church of Tourmanin. After M. de Vogüé.

projecting at the angles so as to transform the octagon into a polygon of 16 sides; by the same disposition in the upper course, a polygon of 32 sides, or nearly a circle, is obtained, and this supports directly the rubble-work dome.

This church at the same time furnishes an example of a polygonal plan quite unlike the primitive basilica, although there is an external addition of an apse.

The church of Baquoza (Figures 9, 10), the upper part of which is ruined, but which can easily be restored, dates apparently from the sixth century. The nave was lighted by a row of windows above the roofs of the aisles. The nave and aisles were all covered with wood.

The church of Kalb Louzeh (Figures 11, 12), is of the sixth century; it is one of the most important edifices for the architect to examine[3] who is in search of marked resemblances between the religious edifices of the Occident and Orient. A spacious semicircular arched opening gave entrance in front to the narthex; the latter was covered by a wooden ceiling and was of only moderate height. Towers on the sides apparently marked the entrance to the aisles; the nave was indicated by its gable, dominating the whole, behind the narthex.

The apse was adorned with two orders of slender columns, with this peculiarity: there was no architrave and the superimposed colonnettes were left isolated. The exterior of the apse resembled in all respects the Romanesque apses of France and Germany.

The church of Tourmanin (Figures 13, 14), also of the sixth century, presents striking analogies to the preceding. Here the edifice rests on a basement, which imparts a nobility of character to it. The *ensemble*, which we reproduce from MM. de Vogüé and Duthuit, was restored without difficulty, owing to the excellent state of preservation in which the ruins were discovered.

Many other examples of Syrian religious architecture might be cited, as the churches of Babonda, Behioh and others, but the dispositions already noted would be found in them, repeated with but unimportant variations.

[To be continued.]

ITALIAN TOWERS.[4] — III.

Santa Barbera.

GOING from Santa Maria Novella to the Arno by the shortest way to the Ponte Alla Carraja you will come into the Piazza Manin. On one side of the Piazza is the Arno, on another a modern picture gallery, on the third, the Hôtel de la Ville with the most resplendent portiere in Florence, and on the fourth and opposite side to the Arno rises the church of Ognissanti. The church with its adjoining monastery covers nearly half a square. There is nothing very interesting in it, a fresco by Ghirlandajo and another by Botticelli and a few minor altar pieces scattered about, while the monastery has shared the fate of nearly all the Florentine monasteries and is now a cavalry barrack, from the inside of which arises, instead of the ancient chant of monks, the sharp piping of key bugles which all over Italy take the place of the drum corps, and if you linger long in the Piazza you are always liable to be run over by a detachment of horse coming around some corner.

The tower of the church is one of the simplest in Florence, and shorn of the tile-covered box on its top, is very good indeed. There is a peculiarity in its construction which one hardly notices at first but which stamps it as probably belonging to an age later than a single glance would lead one to suppose. The rows of small corbelled arches which bring forward the recessed walls at the belt courses, the cornice and the three arches of the upper openings are all cut in long lintels instead of being built up of small stones, as is almost invariable in older work. Then the row of modillions directly under the roof are peculiar. These features occur at times in other Italian towers of this type and you will find almost every detail of this Ognissanti Tower in the tower of Santa Maria Maggiore at Assisi.

[1] "*William of Tyre*," Book I.
[2] M. de Vogüé. "*Les églises de Terre-Sainte*."
[3] M. de Vogüé. "*Syrie centrale*," pl. 122 to 129.
[4] Continued from page 115, No. 752.

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The date of its erection, 1554 probably, will account for these eccentricities. It looks a much older tower now than many other Florentine ones which probably antedate it, a fact due to its comparative neglect and to the stones of which it is built, for they are like those of the Vecchio and Bargello Towers, small and square, laid in a dismal attempt at a horizontal line. The shortening of the two lower openings probably took place when the church was restored and had the

Campanile of the Badia di Settimo.

filling of them been a little less conspicuous the restorer would certainly have improved upon the original; as it is, he made a mess of it.

The façade of the church is insignificant as the façades of sixteenth and seventeenth century churches are apt to be, though they are better in northern Italy, I think, than in Rome. The four hundred and odd churches in Rome with their everlasting façades of gable and console and pilaster, and fat cherubs and two-hundred-pound bed-quilts hung before the doors are among my unhappiest recollections of that city. There is, by the bye, one of the nicest Renaissance façades we saw in Italy, in Lugarno. It was our first Italian church front, consequently we did not then know how good it was, but after we had been there a few months, we learned to appreciate a good church façade built after Columbus's voyage; when we found it, rarity made it striking.

When you have a spring afternoon on your hands in Florence, and have grown a little tired of the glaring light of the sunny pavements and of the chill gloom of the shaded ones, go out through the Porta Romana and up the long straight avenue of the Villa Poggio Imperiale and then ask for the church of Santa Margherita. On your way there you pass close by the tower of Galileo, so-called, and you also pass some of the most remarkable bits of mural painting, on the outside of houses, that exist in Florence. I remember one especially. A huge, second-story double-door, much like the hay-door in many of our New England barns, partly open, and inside the timbers of the building and the stored-up grain appeared, — all the most beautiful and realistic fresco. On nearly every house and shop front we find these frescos, sometimes nothing but a window with one blind open and the other closed perhaps, and the lights and shadows carefully put in; sometimes the whole interior of a church with its perspectives of aisle, columns and high altar at the back, all in this same fresco on the stucco front.

On the second-story walls of the outer court of San Annunciata in Florence, there are little windows painted and painted monks look from them on the crowd below and even the cathedral of Florence itself, has not escaped this passion for painted deceit. Count the windows on the outside of the nave on the north side, some day and then after putting on your winter overcoat, go in and count in the interior on the same side, I do not say the same windows, for they differ both in number and location, but the windows that ought to be the same. In fact they are not windows at all; except two, they are vain delusions. The same or similar conundrum may be found on the other side.

It was not with a view of studying mural painting, however, that we came out into the country. A few moments before you reach Santa Margherita you will come on a little church built close upon the narrow cobble lane. A most frightfully ugly little church, all of stucco and with the most astounding Gothic Renaissance façade done in fresco. Classic portals and rose windows, garlands and gargoyles all commingled. Santa Barbera, I think the church is called. All the authority I have is that of a peasant who was working hard by while I sketched the tower, and so I may be wrong, for the peasant's information is not always accurate, though he always means well and kindly gives you all he can and often a good deal more than he ought. But the name and the church itself are of very little account, the tower is all that is worthy of notice. From a distance we had thought it old and wondered there was no mention of such a landmark in the guide-book, but when we reached it we found it could not have been built over twenty years. It is of the same gray-brown stone which so abounds in this region, stones of a different shape decidedly from those of the older towers, longer and narrower and with a smoothly-tooled face. The architect, whoever he was, drew upon the more ambitious towers within the city, of the Tuscan Gothic period, and indeed, it may be directly from Santa Maria Novella, for that is immediately suggested on seeing this. There are one or two innovations on the older models, the bevelling of the arched openings, for instance, is a decided departure from any of the old examples. Then, too, there is a balustrade of carved stone around the belfry, an extravagance rare even in the richest of the Florentine churches. But the greatest puzzle of all is that such a tower and such a façade should be together. It seems hard to believe that those who approved of the church could have appreciated the tower, and still harder to believe that those who approved of the tower should allow the church to exist in its present state.

The lifting of the pyramidal roof is not managed as well as in Santa Maria Novella. There, the change from the vertical line to the slope of the roof is hardly appreciable; here, a belt course marks it and destroys the unity of the spire at once.

But as the church tower of an almost nameless hamlet, a mere straggling row of cottages, it is a lesson to all country towns, and even if after seeing it you do not approve of the tower itself, you will have seen some most beautiful views of Florence and of the country roundabout, and will have added to your knowledge both of Italian character and language.

We made a good many of these excursions about Florence during our stay there, going off and out through some one of the many gates in the early morning and returning at night. There is no end to the interesting old towns all about up and down the valley of the Arno, and on the hills on either side. Prato, Fiesole, Signa, Malmantile, Pontassieve, and the Badia di Settimo, to say nothing of detached villas and castles at frequent intervals, and among these there is no more characteristic bit than the Badia di Settimo near the village of San Columbano. You can walk there or ride there or

Gate-tower of the Badia di Settimo.

go out on a steam tramway which starts out through the Porta San Frediano. Perhaps the latter method is the best, for the immediate outskirts in that direction are rather unpleasant. A short five-mile ride on this tram brings one to the stopping-point for the Badia, and off to the right of the road you will see the polygonal campanile rising above the low olive and fruit trees, It is not a long walk over to the spot where the ruins of the old abbey are, a walk along nicely paved roads; roads, for a wonder, without the high stone walls on

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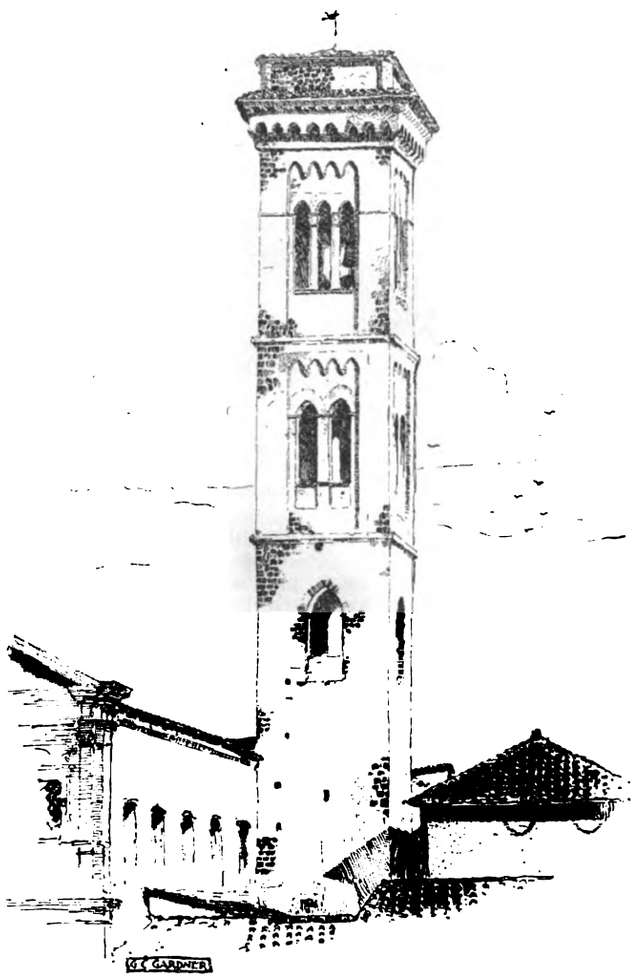
either side which are such a nuisance to the pedestrian in Italy. Out here in the country there are but few of them, and the way runs through the olive orchards and vineyards, and by the stucco farm-houses with only an irrigating ditch and low hedge on either side as boundaries, and often times you can do a little cross-country work if you are good at jumping and do not mind the soft loam. For the irrigating ditches form a net-work over the fields and the ground is rich and black.

The abbey, or badia, of Settimo is now in a partly ruinous state. The old gate tower is a granary. Peasants live in parts of the old buildings and other parts are used as a school, but it is still a most interesting group of buildings, and it is really very old. It was founded about ten hundred by Count Ugo of Brandenburg, who, evidently, a devout man, founded six other abbeys in Tuscany, among them the badia of Florence. Vasari speaks of this at Settimo as showing the influence of the Greek spirit from Venice, which spread at that time more or less over all northern Italy; but of this influence of which Vasari speaks, there is little if any trace remaining now. Count Ugo died before the abbey was finished, and his executors carried out the work. The two towers are interesting as being the



S. Salvadore d'Ognissanti.

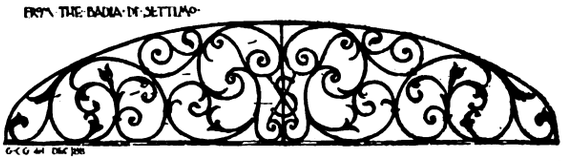
work of Niccolo Pisano. He was called upon by these same executors to finish the abbey, having just come back to Florence from Bologna, where he had executed some very successful work. He repeated here what Vasari called his "most ingenious, most beautiful and most extraordinary" work, the campanile of San Niccola at Pisa, another of Count Ugo's seven ventures in abbey founding. This tower at Settimo is, however, a far more simple one than its Pisan neighbor, whatever ornament it may once have possessed having been stripped from it and it is now absolutely bare. The change from the round to the polygon is unique, for the round is the lower part. Its very materials are a mixture, for the round portion is of stone and above that stone and brick are more or less commingled. It is still used as the bell-tower of its adjoining church and only in that respect has it retained any of its ancient furnishings.

But its neighbor, the poor old gateway has lost even its occupation. Farm-houses have been built against it; its arched openings have been walled up, and all but one of the spaces in the battlement have been filled with brick, and that one is a dove cote, while a tile roof crowns the whole. With the exception of some patching below, it is built entirely of bricks, long and thin, and over the arched doorway is a huge terra-cotta panel, a figure of Christ between two saints and below them the arms of Florence. It is all sadly battered and worn now and is interesting chiefly from its size and the fact that it was built in and forms an essential part of the structure instead of being a mere panel. The overhang of the parapet is a bold bit of construction in brick, testifying to the strength of the mortar that binds it so strongly that it is practically homogeneous now. In fact the lower part of several of the corbels have been broken away.

These two towers, the campanile and this gateway are the most interesting relics of the badia. There is more or less of the ancient wall standing, and from one or two points that, with its battlemented top and the towers behind, make very picturesque views. The whole, however, is falling into such a state of decay that unless steps are taken to preserve it, there will soon be nothing but a shapeless ruin. The campanile will doubtless last, for that is still of the church and until that is deserted it will continue to hold its bells, but for the old gateway there is little hope.

If you tire of the badia before it is time to go back to Florence, go back to the main road again and on to Signa, which lies, perhaps, three-quarters of a mile away. A sleepy and dirty old town, huddled for the most part inside its huge walls which are almost high enough to shelter the tallest buildings within them, walls which have come down, a great part of them, untouched from the Middle Ages. They too, have a battlemented parapet, which corbels out far beyond the line of the wall below, and one or two of the gates are huge affairs of stone, with their upper, arched openings filled-in and used for dwellings. There is little in the town to attract one, but the gates alone are a sufficient reward for the visit.

There are other churches, too, and other towers down this valley of the Arno, but they are hardly worth a special visit unless one has no end of time. There is so much to see about Florence that to go where there is not some special attraction is a great loss. After two or three weeks of steady sight-seeing inside the walls of the city the country is a blessing indeed. Not the country through the agency of a carriage and a driver who shows you all the points of interest,



for then the thought of the heart-rending scene you will have when you reach home and attempt to pay this man and settle upon the extras, is enough to shadow the whole day. But walking, with occasional lifts upon a steam tramway, or very often upon the regular trains themselves — for the trains are like mules, hard to understand yet once understood useful and reasonable — walking, with these aids now and then, leaves one absolutely independent for the enjoyment of scenery, natural or artificial, and with plenty of time, I can conceive no pleasanter way of seeing the whole of Italy, than on foot.

GEORGE CLARENCE GARDNER.

[To be continued.]

VENETIAN KNOCKERS.

IT is a favorite cry with enthusiasts that Venice has been delivered over into the hands of the Philistines, that in fact, she is being spoiled by civilization. It may be that civilization has much to answer for as a debaser of men and of things, but as regards Venice we think that her enthusiasts exaggerate. The other cities of Italy have suffered greater, swifter changes than she. Rome, Milan, Florence, rich yet in the beauty of a past day, have lost far more than has Venice, who, just from her position in a zone of azure sea, still keeps much of her old magnificence, displaying various outward and visible signs of the splendor that was hers when once she held "the gorgeous East in fee, and was the safeguard of the West." Indeed, it is by these many outward and visible signs that we may trace her whole artistic life from its commencement, and read her story in her streets, as written in bronze or stone.

Not the least interesting chapter in this chronicle is that which deals with Venetian sculpture and the varied use of metal-work as

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one of the ornamental accessories to architecture. Of such examples of this kind of work Venice can yet show a great variety that have not succumbed to the revolutions of time.

Until the sixteenth century no prominence was given to the external ornamental details of a palace, the craft of the architect and the painter being deemed sufficient to complete its grandeur and beauty. But by degrees bronze ornaments of cunning shape became fashionable, and locks ornamented with patterns of tracery, lamps, candlesticks, door-handles, and other house fittings were designed and executed by the great masters themselves or their disciples, and in the making of these they put forth all their skill. Before long a school of bronze founders was established which produced much noble work; and with the best of this work we may count some of the elaborately beautiful knockers that yet embellish the doors of Venetian palaces, and to which we would here draw the attention of our readers.

Knockers and door-handles in Venice, like those of our own Early English and Decorated date, were first of simple character, usually in the form of a ring or a hammer. These were the parent forms which, by degrees, became subject to elaborate development. Some of our Early English door handles and knockers will compare favorably with those of Venice, just from their simplicity and grace, as we may see by the specimens at Stogumber, Somersetshire, and Stockbury, in Kent. Not many of the famous Venetian knockers remain

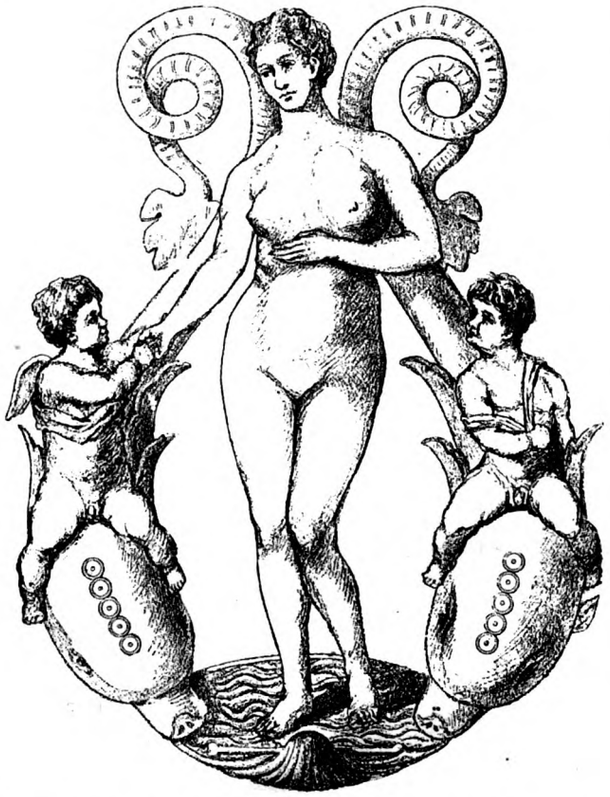

Fig. 1. Knocker on the Palazzo Cavalli, ascribed to Giovanni di Bologna. From a drawing by Arthur Lippitsch.

in their original positions today. Dealers in antiquities are ever eager to secure them for their shops, knocker-wrenching being quite a lucrative pastime in Venice — not, as elsewhere, a vulgar sport. Famous among the knocker designers for Venice was Giovanni di Bologna, who was born in 1525, and who left his native town, Douai, to study in Rome under no less renowned a master than Michael Angelo. He also spent some time in Florence, where Bernardo Vecchietta became his patron, and where his first important efforts at original work were made. His failure to secure the commission for the Florentine fountain did not discourage him; and later, at Bologna, he saw his chance and seized it. The fountain there, with its nine-foot Neptune, its Cupids, and spouting mermaids, took him three years to complete. It counts as one of his most effective works and it first brought him into prominence as a master of his art. Among Giovanni's other successful achievements we have the bronze gates of the Duomo at Pisa, the equestrian statue of Cosimo I, and that of Henri IV in Paris, which last was partly the work of his pupils.

Our first illustration shows a knocker which has been ascribed to Giovanni di Bologna. It is on the Palazzo Cavalli, near the Post-Office, and may be reckoned as one of the most notable examples of the great bronzist's skill. Two dolphins hold in their mouths a shell on which stands Venus newly arisen from the sea-foam, attended by two plump cherubs who ride gaily on the dolphins' backs. One of the cherubs holds Venus by the hand. The dolphin-knocker is a very favorite design, and it occurs frequently with variations. Here, in our second plate, we have another specimen of it, in the knocker that belongs to the Palazzo Balbi-Valier, on the Fondamenta Duodo Barbarigo. The palace in question was built in 1570 by Alessandro dello Volpe, a pupil of the great Sansovino, who taught him at the schools in Venice. Different again is the large knocker on the Palazzo Reale (Figure 3) which keeps to its earlier, simpler form,

Fig. 2. Knocker on the Palazzo Balbi-Valier.

the hammer form as distinguished from the ring. As the only important example of its kind in Venice this knocker merits particular notice, and we might contrast it, just from its marked difference, with another hammer-knocker of early date on a house in the Rue des Consuls, Auxerre, where the hammer consists of a long, lean leg, which moves on a hinge under the effigy of a man. More elaborate

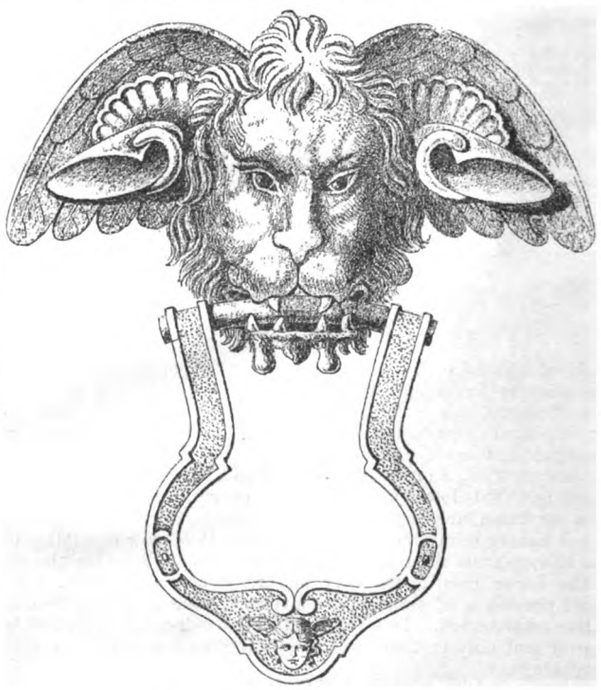

Fig. 3. Knocker on the Palazzo Reale.

is the knocker of the Da Ponte Palace (Figure 4), a residence designed and built for the Doge Nicòlo da Ponte in 1560. The architect of this sumptuous palace was Sansovino, but there is no evidence to show whether he designed the knocker which served to ornament

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its doorway. The female figure in the centre may be taken to represent Venice, caressing two lions, for whom she has provided water in the scallop-shell which forms the base. Perhaps some want of refinement is noticeable in the way the animals have been executed; indeed, it is upon the modelling of the female's form that all the cleverness of the artist would seem to have been spent. A knocker

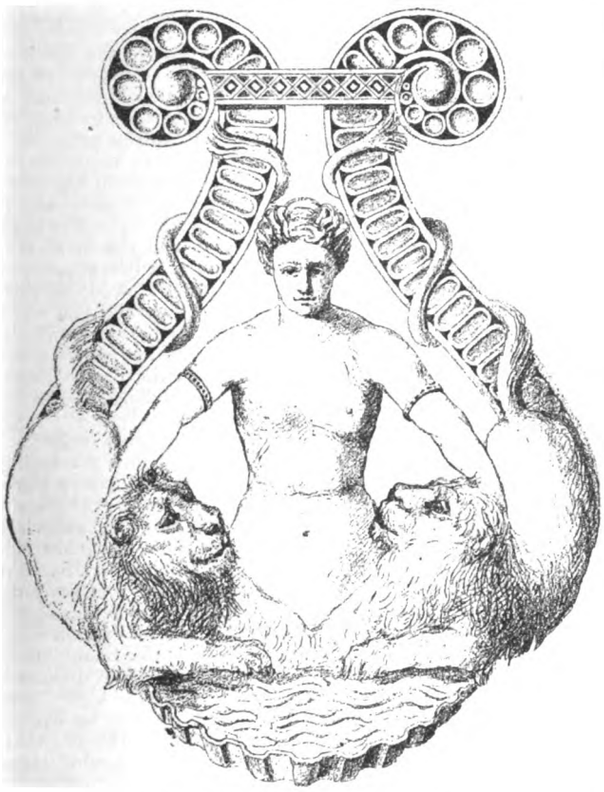

Fig. 4. Knocker on the Palazzo da Ponte.

precisely similar to this may be seen in the South Kensington collection; in fact, we are inclined to believe that, if not the original, it is an exact replica of the Da Ponte knocker. It was purchased for two hundred francs — a trifle in comparison with the prices given for other knockers which the Museum possesses. All the other South Kensington examples will well repay examination. One very handsome knocker among these was bought at the sale of the Soulages collection, and cost £80. It represents two nymphs embracing, while on their shoulders stands a Cupid, two others being

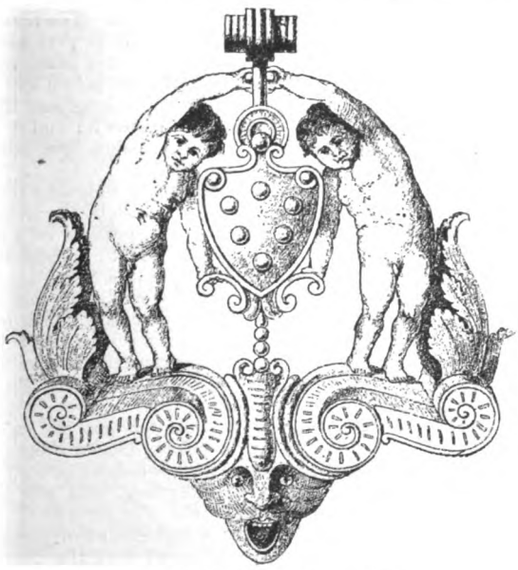

Fig. 5. Knocker on the Palazzo Zorzi.

poised on either side to give balance to the design. Another, costing £20, from the Portales collection, shows a pair of coy nereids (not youths, as the catalogue states) who hide their breasts, and whose figures fancifully terminate in foliage and are surmounted by a mask. Another charming little knocker to be seen at South Kensington is one that shows dolphins holding a scallop-shell, a swan being placed in the centre. For grace and symmetry this ranks with the best; it is simpler, less ambitious than some, but none the less pleasing for that.

A most interesting knocker which, as a design, takes its place between the primitive hammer-knocker and the more elaborate lyre or dolphin knocker, is the one we find on the Palazzo Zorzi, our fifth plate. The framework of the design is formed by two Cupids who hold a coat-of-arms, at the base of which is a mask. As illustrations 6 and 7 show, masks in the mouths of snakes or dolphins were often chosen as the central ornament in the artist's design, the mask taking the place of the boss which originally served to show where the knocker fell. Nothing more delicately ornamental than these last two can be seen among all the noteworthy knockers which Venice still possesses. One is on a private residence in the Calle Rio Terrà, the other until recently was in the Calle Larga. The house in the Calle Larga, dilapidated in parts and in parts restored, bears the date of 1582, so it is quite within reason to assume that the knocker it possessed was designed and executed at this time. It is hardly older than that date. But it no longer adorns the outer door. Antiquity-mongers have had their will of this house; the bric-à-brac hunters could not long suffer the knocker to remain untouched. Doubtless it has passed into the dark treasure-houses of Jewry, and Mr. Lippitsch, to whom we are indebted for a sketch of it, came only just before its rape in time to rescue it by his pencil from oblivion.

The fate of this knocker has been the fate of nearly all, for few have kept their original places and can yet be admired *in situ*, where

Fig. 6. Knocker on a private house in the Calle Rio Terra.

the artist himself first put them. Local and foreign collectors of *objets d'art* do their best to buy them up, to sell at an amazing profit. It was possibly from a conviction that they would disappear, as well as through zeal for his city's art, that in 1758 a Venetian nobleman, Count Pietro Gradenigo, published a little set of water-color sketches of the most famous knockers then existing in Venice. In this task he had recourse to the help of a German artist, who completed a series of sketches, the originals of which are now to be seen at the Museo Civico. The volume is thus entitled: "Battaori, Batticoli e Battioli in Venezia. Jo. Grevembroch. 1758." Of this work a reproduction in autotype was brought out by Signor Brusa, which Ongania published. If it had been supplemented by a volume of text, its value to students would have been greatly enhanced; the plates themselves are, on the whole, quite coarsely executed. In this collection we may find the characteristic Ottobon knocker at San Severo, which displays the family coat-of-arms surmounted by a papal tiara and keys, in memory of Pope Alexander VIII, who belonged to the Ottobon family. He was Pietro Ottobon, and filled

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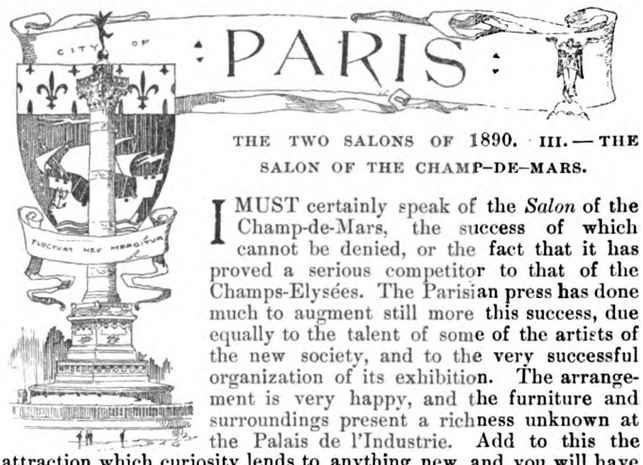
the Papal chair from the year 1689 to 1691, which fact allows us to fix the date of this knocker as not earlier than the last decade of the seventeenth century. At South Kensington may be seen a fine bronze bust of Pietro Ottobon, which is ascribed to Algardi or Bernini, but which more probably was produced by one of their aptest pupils. The face has that look of weakness and benevolence which we find in so many modern Venetian faces; the curved moustache, the *barbiche*, the *baretta*, might all belong to any easy-going, good-humored son of Venice to-day.

The design of another famous knocker, the Grimani knocker, appears in Gradenigo's book; and if we mention it here, it is because of its resemblance to our sixth plate, of the knocker in the Calle Rio Terrà. This design was one that evidently had a great vogue in Venice, and shows dolphins holding a mask, which took the place of the boss where the knocker-flapper fell. To this day knockers of a similar type are produced in Venice, for the art is not a lost art; a school of bronze founders still exists there and flourishes. In all the crafts which they follow to-day, modern Venetian artisans — the glass-blowers, wood-carvers and metal-beaters — show very remarkable ingenuity; while as regards invention, the power to create fresh designs, they do not need it, for they have the multitude of rich and handsome patterns bequeathed to them by their great forerunners; and, as discreet and ingenious successors, they are content to copy since they cannot improve.

The art of working in metal is largely followed by Venetians; so to is wood-carving, and, of course, glass-making. In fact, ornamental work — work into which design enters — has ever appealed

Fig. 7. Knocker until recently on a private house in the Calle Larga.

to the craftsmen of the lagoons, and in its execution they excel. Nor does encouragement of these arts come alone from the foreigner. Wealthy Venetian patricians prefer to engage their compatriots for the task of embellishing or refitting their palaces, instead of calling in the skill of Paris or of Vienna. And resident *forestieri*, the English and Americans who have chosen Venice for their home, when decorating their houses are all anxious to let tradition guide them, ever choosing Classic models where chances for ornamentation occur. Rarely, as he walks in the *calli* or floats down the canals, will the traveller experience any rude shock at the sight of outrageous restoration. He will not be able to point to many instances of a deliberate exchange of the noble and the right for the vulgar and the base. Indeed, if they were ruthless and ignorant, which they are not, the restorers and touchers-up could never wholly spoil Venice. For the poet, Venice is still the strangest of the world's visible poems; for the dreamer, she is still sufficient in her manifold loveliness. The Philistines have not yet entered in to take possession. It may be that in some of her high places a hideous factory is set up as an unsightly tabernacle to Baal, the god of pelf; fragrant lagoon islands may have been remorselessly turned into mud banks, on which to tinker railway carriages and trucks; tramways may run the uneven tenor of their way across the Lido; or pert penny steamers shriek and scuffle along the majestic canal whence haughty Doges floated forth to war. And yet is Venice spoilt? Is she quite vulgarized — an abomination, in short? Ah, no; how much remains to us yet! She is still unique, a joy forever, being saved from the materializing touch of the *zeitgeist*, rescued from Philistinism by her inviolate bride, the sea. — *The Art Journal.*



THE TWO SALONS OF 1890. III. — THE SALON OF THE CHAMP-DE-MARS.

I MUST certainly speak of the *Salon* of the Champ-de-Mars, the success of which cannot be denied, or the fact that it has proved a serious competitor to that of the Champs-Elysées. The Parisian press has done much to augment still more this success, due equally to the talent of some of the artists of the new society, and to the very successful organization of its exhibition. The arrangement is very happy, and the furniture and surroundings present a richness unknown at the Palais de l'Industrie. Add to this the attraction which curiosity lends to anything new, and you will have reasons enough for the crush which day after day pervades the Champ-de-Mars, imparting to it a festal air, which recalls the days of last summer. It is pleasant to see again the pretty Palace of Fine Arts, to find one's self under its beautiful dome, and to ascend again its spacious staircases.

From the side of the gardens we reach the great reception-hall, decorated with much taste, where one may rest after traversing the galleries. The latter occupy the first-story rooms, where were collected last year the pictures of the decennial French exhibition, with those of the great Exposition. These form two long galleries, extending for 90 metres, with a central room, on the other side of which are several additional apartments, of smaller size, devoted to paintings, drawings, pastels and water-colors. The sculpture is placed under the dome, and on the galleries and landings surrounding the entrance-hall. There is much difference of opinion as to the relative merits of the two *Salons*. That of the Champ-de-Mars, which contains the works of several talented and distinguished artists, whose names alone would insure success, is highly extolled by a certain public, which, perhaps, thinks that four or five names are enough to make a *Salon* good. In my opinion, this is a mistake. These few artists of undoubted power have been obliged to surround their pictures with works of mediocre merit, and, in order to swell the number of pictures shown to a respectable figure, have found themselves also forced to send canvases of their own which do them no credit; so that I think that their personal success would have been as brilliant at the Champs-Elysées, where they would have had better surroundings. At the Champ-de-Mars, certain artists have sent six, eight, ten, and even as many as seventeen pictures; so that we find a sort of series of little private exhibitions, in which the defects of the artists are occasionally made more prominent by repetition, when they would have been unnoticed in one or two pictures hung among a multitude of others. This inconvenience is particularly serious of the landscape-painters, whose collections look like batches of picture-manufacturers' goods, so uniform in treatment and manner as to excite no interest. M. Damoye, a master of his art, has no less than ten landscapes. The first excites admiration by the delicacy of its tones, its aërial perspective, its breadth of treatment, and its truthful expression of nature. These sentiments of appreciation do not desert one before the second picture; but at the third one does not linger so long, and the tenth is passed as carelessly as if we had already seen it; and if persons interested and skilled in art receive this impression, how much more strongly must it be felt by the ordinary public!

The *Salon* of the Champ-de-Mars comprises only 911 paintings. Thanks to the drawings, water-colors and pastels, engravings and sculptures, it reaches the total figure of 1,409 works of all kinds. We will run through them quite rapidly, and, first of all, let us salute the artist whose truly great works illuminate this *Salon*, M. Carolus Duran. He shows seven portraits and a study of the nude — a woman, seated, seen from behind, a very remarkable work. M. Carolus Duran, who has sometimes shown us portraits brilliantly laid in, but careless, joins, this year, to his qualities as a colorist the merit of having sacrificed nothing in bringing his works together, and any taste may be satisfied among them. Four portraits of women, standing, in elegant toilettes, show the dazzling superiority of the artist from the point-of-view of color. One of these ladies is covered with a fur mantle, opening over a ball-dress entirely of red, the whole detaching itself against a background which is also red. It is admirably skilful; however, we prefer the portrait of a young girl in a gray toilette, relieved against a background of plushy gray. In this the note is more refined and quiet, and the harmony is perfect. But the two most beautiful bits in the exhibition of M. Carolus Duran are incontestably two portraits, heads and busts only: one of an aged lady, in a black dress, the other of a man. Nature is here rendered with astonishing truth and adroitness. Looked at near, these pictures present no dryness of line; the passage from light to shade is indicated by a firm modelling, without hardness, supple, yet not soft. Without violent contrasts, such as any one can make, his figures have a relief which gives to the subject the appearance of life, and makes one think that the picture

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is something more than an ordinary portrait. M. Carolus Duran carries off this year one of his greatest successes. We cannot say as much for M. Roll, whose talent, which has been progressing for some years, and reached last year a very high pitch, has fallen this time into an unfortunate mannerism. Out of nine canvases which he has sent, we find only one portrait of a woman which is good. The portraits of Mme. Jeanne Hading and of M. Coquelin the younger, are flat; the tones are fresh, but the figures look as if they were cut out of pasteboard. M. Roll has also signed a canvas, full of a dirty, yellowish-gray color, which he calls "High Tide." This is entirely bad.

M. E. Duez has made a portrait of M. Georges Hugo, which is also not good, and deserves the same reproach of flatness. Happily, beside it we find a flowery meadow, by the same artist, prettily treated, and very fresh in tone.

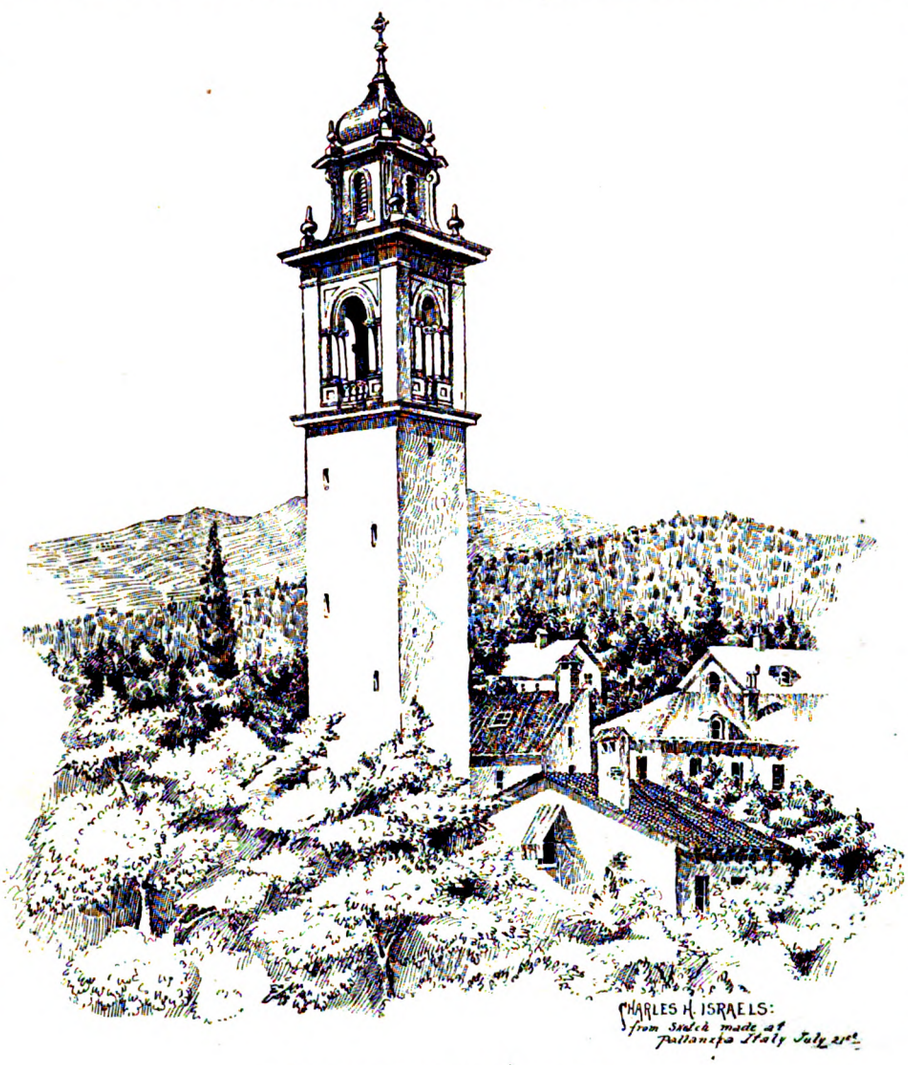
Every one knows the charm of the little portraits by Bastien-Lepage. M. Friant recalls them in a delicious portrait of a woman, treated in the same spirit and the same style, delicately studied. In another little picture, entitled "Political Discussion," M. Friant shows us four workmen seated at a table, and disputing. The figures, very vigorously painted, have expressions from the very life; the four personages are on a terrace, and the landscape extends into distant depths, full of air and light. Another canvas of large dimensions, from the same artist, represents two naked boys wrestling on the bank of a river, where several of their companions are bathing. There is much talent in these figures, which are life-size, and in the landscape, but we find more emotion and sentiment in the little portrait and the "Political Discussion."

Several other artists appear to have returned to works of small dimensions, and M. Gervex shows an adorable study of the nude, full of charm and delicacy, a bright and enticing little cabinet-picture. In a very different vein, M. Gervex has grouped around the editor's table of the journal, the *Republique Française*, the portraits of MM. Reinach, editor-in-chief, Spuller, Challemel-Lacour, Waldeck-Rousseau and Emmanuel Arène. This manner of grouping life-size portraits often gives the peculiar effect of a panorama, or a museum of wax-figures: notwithstanding the talent of the artist, one feels something false, recalling a *tableau-vivant*, and it is better to treat the matter as a *genre* subject, as in the famous battles of M. Meissonier, where almost all the figures are portraits.

We must, however, acknowledge the skill of M. Gervex, and also that of M. Lhermitte, who has shown a panel intended for the decoration of the Salle des Commissions of the Faculté des Sciences at the new Sorbonne. Before a numerous audience, the professor, Sainte-Claire Deville, is delivering a lecture on chemistry; he is surrounded by several other *savants*. There is in this canvas an enormous amount of talent; but M. Lhermitte produces in us a greater artistic sensation with his rustic subjects, taken direct from nature, full of observation, and as charming as nature itself.

To finish with the portraits meriting attention, we must mention those of MM. Edelfelt, Mathey, who has also adopted small dimensions, and M. Courtois, who must be reproached with a rather flat manner. Need I speak of M. Sargent? This pupil of M. Carolus Duran appeared full of promise; his first contributions to the Palais de l'Industrie recalled the charming qualities of his master, but the artist has wandered away since. This year, both his pictures are bad: disagreeable and harsh in color, and doubtful in drawing. They are two portraits, one of which, that of an English actress, Ellen Terry, in the part of Lady Macbeth, detached against a gray-blue background, looks like an India-ink study of a Byzantine mosaic, rendered with an exaggeration of the tones. It is curious from this point-of-view, but very queer.

M. Stevens, a Belgian artist, but a naturalized Parisian in the artistic world, has sent eleven pictures to the Champ-de-Mars. We venture to confess that we cannot comprehend the enthusiasm excited by this painter, whose work, entitled "The Young Widow," although lauded by some fanatics, seems to us a specimen of a style old-fashioned, finicking and pretentious. Two other Shakespearian figures, Ophelia and Lady Macbeth, want sentiment and emotion, and would certainly be unnoticed without the signature of the artist. Three pretty "impressions" of true nature, although smacking still a little of romanticism, complete more pleasingly Mr. Stevens' exhibition. We do not understand much better the art of M. Carrière, who sees nature through a gray mist, and whose portraits appear enveloped in a cloud of ashes. This is the more to be regretted, as M. Carrière evidently knows how to draw, which is not the case with all the artists of the new School.



Campanile at Pallanza, on Lake Maggiore, Italy.

Such a reproach, however, cannot be addressed to M. Aublet, whose collection is charming, clear and luminous. Here one has real open air. The largest of the nine pictures signed by this artist represents some young girls picking flowers in a meadow with tall grass. The landscape is in bright sunshine, and the brilliant light extends over the whole canvas, without any artifices of violently contrasted shadows. Three young girls occupy the foreground; one of them, dressed in a sea-green gown, harmonizing perfectly with the verdure of the landscape, shows the skill as a colorist of M. Aublet, who has found easier effects in the black and red and cream-colored dresses of the two others. Unfortunately, some of the distant foliage is a little too blue. M. Aublet shows us besides several very charming studies of young and elegant bathers at the seashore, rendered in a very delicate gray tone, which succeeds in giving a bright and luminous impression, notwithstanding the extreme simplicity of the color.

M. Rosset-Granger is less simple in his effects, and his sunlight is more violent; but in his "Holiday Evening in Provence," he has rendered with skill a curious effect of light cast by Venetian lanterns, which illuminate some young girls, standing at the edge of the sea, which extends through the clear night to the horizon.

We must mention also M. Montenard, the marvellous painter of the Southern Sun; M. Artigue, who shows some very pretty little Oriental subjects, and M. Dubuffe, whose sketches of travel are cleverly rendered.

M. Béraud has devoted himself to a kind of work which will always bring him success. A crowd stands constantly around his "Monte-Carlo," in which all possible types of gamblers surround the roulette-table. There is in this picture, which is well composed and amusing, much observation and intelligence, and it attracts quite as

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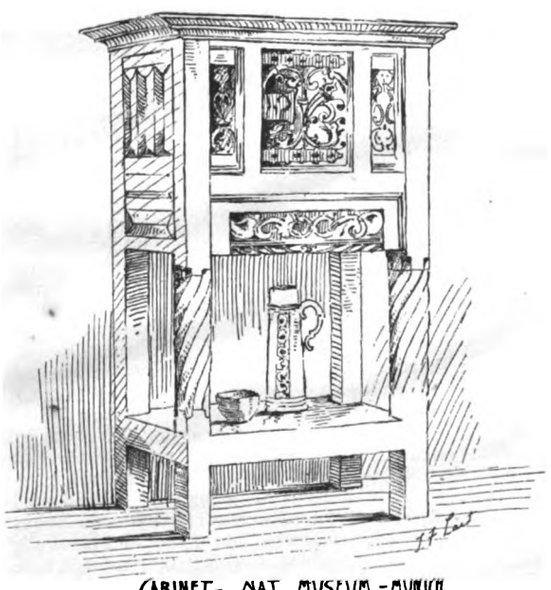
much attention as the single canvas of M. Meissonier, who keeps a sentinel always on guard beside his work. "October, 1806," is the title. Napoleon I, on a hill, surrounded by his staff, follows with his eyes a charge of cavalry, which is just discernible on the plain below. Immovable on his white horse, in the attitude of a statue, he forms the central and most interesting point of the picture. Behind him, the generals are in movement. One of them, seen from behind, gives an order, and the gesture is rendered with incredible precision. The whole picture is a real revival of the Imperial epoch, and constitutes one of the most beautiful works of M. Meissonier, a worthy rival of his famous "1814."

We have already mentioned M. Damoye among the landscape-painters; we should also speak of MM. Durst, Roger Jourdain, Cazin and Muenier, without forgetting M. Guignard, who recalls Corot in a pretty little frosty landscape. After mentioning the works sent by M. Ribot, whose portraits, with their black shadows, look like Riberas escaped from the Louvre, we will terminate our visit to the *Salon* of the Champ-de-Mars with the great decorative picture sent by M. Puvis de Chavannes. I have already had occasion to say that this artist has his fanatical admirers, and his equally fanatical detractors; but, without taking part with either, I continue to believe that the unequal talent of M. Puvis de Chavannes merits at once praise and criticism. His composition, entitled "Inter Artes et Naturam," is destined to decorate the stairway of the Museum at Rouen. In a meadow, planted here and there with little clumps of shrubbery, appear personages, some naked, some clothed, personifying different sorts of studies. The meadow overlooks the valley of the Seine, and one perceives on the horizon the blue *silhouette* of the city of Rouen. All the background is charming, the composition is decorative, and the general tone harmonious; but what is shocking, apart from the defects of drawing, purposely introduced to give an effect of archaism, is the strange diversity, in form and color, of the costumes. It is an incomprehensible and somewhat ridiculous jumble of ancient and modern habiliments. Here is a specimen of a cylindrical shirt-collar; there is a Spanish mantilla; near by are workmen's blouses, and not far off are hunting coats. All this tempts one to laugh, and destroys the charm of some of the figures taken by themselves.

Sculpture is little represented at the Champ-de-Mars, and counts only 83 numbers, from 29 artists. We will only mention some pretty little sketches, cleverly modelled by M. Rodin, and a very beautiful bas-relief in bronze, of small dimensions, by M. Dalou, who also shows the model of the statue of Victor Noir, to be placed on his tomb. Victor Noir (the journalist killed during the Empire by Prince Pierre Bonaparte), lies on his back, in a calm attitude, apparently asleep. There is much talent in this sculpture, which shows, however, plainly the poverty of the resources, in a decorative point-of-view, furnished by the modern frock-coat and the stove-pipe hat.

M. Brincourt.

WOLSEY'S "CONFESSIONARY" AT HAMPTON COURT.



THE following is Sir J. C. Robinson's description of the Confessionary: —

The public will doubtless wish to have further information respecting the interesting ancient room recently thrown open at Hampton Court Palace. In Walpole's "Anecdotes of Painting in England" occurs the following passage: — "In a small room called the Confessionary, near the Chapel at Hampton Court, Vertue found several Scripture stories painted on wainscot, particularly the Passion. He and Sir James Thornhill agreed that they were much in the style of Raphael, particularly the small figures and landscapes in the perspective, and not at all in the German taste. These Vertue concluded to be of Luca Penni."

The observation of Vertue and Thornhill was put on record in the earliest years of the last century. Walpole, however, into whose possession Vertue's memoranda had fallen when he compiled his work some fifty years later, does not seem to have taken the trouble to find out the room in question or to have in any way verified the statement. The room and the pictures within it were in fact completely lost sight of for more than a century and a half, and have only just been brought to light again. A year or two ago, on the death of an aged lady who for more than forty years had occupied one of the apartments in the old part of the palace, the room in question, which during her time had served as a butler's pantry, was recognized as the forgotten "Confessionary," and the pictures noted by Vertue were found on the walls, doubtless just as he saw them. Fortunately the room is in close proximity to one of the state apartments in Sir Christopher Wren's more modern buildings, to which the public have access, and thus it has been possible to make a communication with it. The room has now been detached from the habitable suite of apartments, and it will be henceforth open to the public. It has been carefully put in order, certain restorations having been effected by Her Majesty's Office of Works, and the pictures have been attended to under my direction.

Besides the panel pictures a special feature of the room is the splendid decorated ceiling and wall frieze beneath it; both the pictures and the ceiling are doubtless the work of Italian artists working in Wolsey's time. It is supposed that this room was the great Cardinal's private oratory. The old name, the "Confessionary," seems to point to this. There are, however, certain difficulties attending this theory, which perhaps this letter may induce competent authorities amongst your readers to endeavor to resolve. In the first place, the room seems too small for such a use, though it was originally somewhat larger, one end having been apparently cut off when the Wren buildings were erected. Still it would scarcely seem to have been spacious enough to have served the purpose of the private chapel itself; moreover, it contains a fireplace, which would scarcely have been found in a chapel. The series of painted panels, though fitted to the upper part of the walls, as a continuous series, are evidently not in their original position, and it is scarcely likely that they can have been originally designed to decorate this narrow and rather gloomy room. Whatever purpose, however, the apartment may have served, it seems evident that it must have been an important one; this is evidenced by the beautiful ceiling, which is apparently the original one and put up in the place it now occupies.

The pictures, which represent five subjects in the Passion of Our Saviour, are painted in oil on thick oak panels. They are now all joined together as a continuous frieze measuring upwards of 40 feet long by about 7 feet high, but originally they were doubtless divided by pilasters or decorative frames of some kind, which have perished. They have been replaced in the room exactly in the same position which they occupied when found. The ceiling and frieze of the room form a decorative work of the richest and most elaborate Italian Cinquecento style. They recall the celebrated ceilings of the apartments of Isabella Gonzaga in the old palace at Mantua. This ceiling at Hampton Court is quite as fine as any of the latter, and might almost be supposed to have been the work of the same artists. The ceiling is in panels, in the centre of which are the large Tudor roses, surrounded with the richest carved arabesques, dolphins, cornucopiæ, amorini, etc., and on the frieze beneath is repeated Cardinal Wolsey's motto, "*Dominus mihi adjutor*," in raised letters, and the whole work is richly painted and gilt.

Now as to the pictures. Vertue and Walpole assumed that they were by Luca or, as he is otherwise called, Bartolommeo Penni (perhaps there were two Pennis in England in Henry VIII's time). It is obvious that several distinct hands have been concerned in the series. Besides the Pennis, we know that Girolamo di Treviso and a certain Antonio Toto del Nunziata were in Henry VIII's service. Probably both of these artists may also have had a share in the work. In any case an interesting field for research and critical observation is now opened. That the artists, whoever they were, were familiar with the great contemporary masterpieces produced in Rome is evidenced by the fact that one of the Hampton Court compositions is a copy from the well-known picture of the "Flagellation of Christ" in Trinità de' Monti, Rome — the work of Sebastian del Piombo. Another elaborate composition — the procession to Calvary — very much resembles the manner of Fra Sebastian, and may possibly have been painted from his design.

The coloring and execution of the pictures in general recall the style and technique of the great Veneto-Roman master, which at the period in question, as we know, so profoundly influenced the "Frescanti" of the Raphael following in Rome.

The Hampton Court pictures, in fact, as works in oil, are exactly the kind of productions which would have proceeded from the hands of good but not preëminent masters, originally trained in the severe Roman school and chiefly accustomed to work in tempera or fresco. It seems very likely that Wolsey's relations with Rome led to the bringing over to this country of a little colony of Italian artists, several of whom permanently settled here and became naturalized. Further on in Henry VIII's reign we find our two already-quoted names Anglicised into Antony Tote and Bartholomew Penn. The former was made Sergeant Painter to the King, and both of them

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figure in the old accounts of the times as the recipients of annual salaries, occasional gratuities and payments for livery coats, etc, as the King's servants.

There is doubtless much more to be said as to the personality and labors of these old Italian artists in England, and I can only hope that some less busy person than myself will be found to take up the subject. I should add that the old oak "linen scroll" panels forming the dado of the room have been recently collected together from other ancient rooms in the palace and adapted to their present situation. — *The Architect.*

ILLUSTRATIONS

[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

INTERIOR OF THE GARFIELD MEMORIAL, CLEVELAND, OHIO. MR. GEORGE KELLER, ARCHITECT, HARTFORD, CONN.

[Gelatine Print issued with the International and Imperial Editions only.]

THE GARFIELD MEMORIAL, CLEVELAND, OHIO. MR. GEORGE KELLER, ARCHITECT, HARTFORD, CONN.

EXTERIOR VIEW.

THE DOME.

WAR AND LABOR; TWO SECTIONS OF THE INTERIOR FRIEZE.

GARFIELD AS ORATOR; FROM THE EXTERIOR FRIEZE.

CONNECTICUT AND NEW YORK: TWO OF THE MEMORIAL WINDOWS.

THE ENTRANCE.

Statue of Garfield for the Garfield Memorial. Mr. Alexander Doyle, Sculptor.

A REPRODUCTION and description of Mr. Keller's first design for the Garfield Memorial was published in the *American Architect* for August 30, 1884, and our readers will doubtless find it interesting to compare them with the modified and completed work, which was dedicated on May 30th last. The memorial is situated in Lake View Cemetery in the suburbs of Cleveland, and is built of native Ohio sandstone. The tower is 50 feet in diameter and its top is 180 feet from the ground. The porch at its base is decorated with a frieze divided into five sections, the figures in which are life-size. The central section, which we illustrate, shows Garfield as an Orator, and the others represent him as Teacher, Soldier and President, and as lying in state in the Rotunda at the Capitol. Within is the memorial hall, which is circular in form and surrounded by a vaulted corridor or vestibule. The marble statue of the lamented President is to stand in the centre of this hall or shrine, beneath a dome supported by pillars of dark-red polished granite, and inlaid with Venetian glass mosaic on a gold ground. The stars and stripes of our national banner have furnished the motive for the decoration of this dome. The hall is richly decorated with stained glass, mosaic and colored marbles. A processional frieze of mourning figures bringing tributes of love and respect, executed in marble mosaic, encircles it just above the arches. The eight compartments of the frieze (two of which are here reproduced) are respectively entitled: War; Labor; Literature; Concord; Law; Justice; the Offerings of Veterans; and Columbia and her Daughter States before the bier of Garfield. The mosaic is in buff and gray tones with a background of deep red. Over the entrance door in the corridor are seated figures, in mosaic, of War and Peace. Four panels of mosaic, two on either side of the door, and ten stained-glass windows, bear female figures representative of the thirteen original States of the Union, and Ohio, Garfield's native State. Two of these windows, portraying respectively Connecticut bearing her Charter Oak, and New York with the Statue of Liberty and an ocean steamer, are among our illustrations. The arms of each State are beneath the figures. The body of Garfield is placed in the crypt beneath the hall. The exterior reliefs were sculptured by Mr. Caspar Buberl, and the cartoons for the mosaic and stained-glass were the work of Mr. H. Walter Lonsdale. The mosaics were executed by Messrs. Burke & Co., of London, Paris and New York, and the stained-glass by Messrs. Worrall & Co., of London. The cost of the memorial has been about $150,000.

[Additional Illustrations in the International Edition]

ORNAMENTS AFTER LUCAS VAN LEYDEN.

[Copper-plate Engraving.]

OUR readers will find it very interesting to compare with the magnificent specimens of modern ironwork recently published in the *American Architect*[1], these three ornamental designs in forged iron from the hand of Lucas Van Leyden, the celebrated Dutch engraver of the first half of the sixteenth century, specimens which are most interesting to examine and refer to. The more we study them, the more we wonder at the amazing skill and versatility of certain artists of this now remote epoch, and we cannot examine their productions without astonishment. In what school did these men learn to compose and design architectural ornament? Without broaching any theories on this point, we cannot do better than to imitate until we can excel their achievements. These groups of griffins drawn with so much knowledge, and so gracefully enclosed and finished off, and the four medallions in iron raised with the hammer, are all worthy of careful study.

EXAMPLES OF OLD ORNAMENT.

[Copper-plate Engraving.]

THESE further specimens of ancient ironwork are equally interesting by the side of modern productions, and it is easy to see that these panels in iron *repoussé* are wonderfully well designed and composed, and are executed with skill which it would be hard to equal now-a-days.

HOUSE ON CITY-HALL STREET, VIENNA, AUSTRIA. UNION BUILDING ASSOCIATION, ARCHITECTS.

[Gelatine Print.]

SKETCHES OF IRONWORK. DRAWN BY MR. W. J. N. MILLARD.

STALLS, BOZEN, TYROL. DRAWN BY MR. W. J. N. MILLARD.

MONREALE CATHEDRAL, SICILY. DRAWN BY MR. W. J. N. MILLARD.

FOUNTAIN, TAORMINA, SICILY. DRAWN BY MR. W. J. N. MILLARD.

VILLA AT WOODFORD, ENG. MR. THEO. MOORE, A. R. I. B. A., ARCHITECT, LONDON, ENG.

SEMI-DETACHED VILLAS, LITTLESTONE-ON-SEA, KENT, ENG. MR. PERCY B. TUBBS, ARCHITECT, LONDON, ENG.

THE design we illustrate this week is one of a number now being carried out on this estate. The external walls, chimneys and towers will be of red Elham Valley bricks and Portland stone dressings. The upper portion of front and returns will be half-timbered work in Keene's cement, and the ornamental panels of Brown's foliated tiles in color to match the cement. The roofs will be tiled with Elham Valley red roofing tiles. The windows will have casements,

[1] See Nos. 750 and 755.

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and the upper portions divided by small bars into 6-inch squares. This estate, which until recently was comparatively unknown, lies on the south coast of Kent, between Folkestone and Dungeness. The extensive bay is sheltered on the northeast by the heights of Shorncliffe and Dover, and is fanned from the south by the delightful summer breezes from the Channel. The marine picture is one of singular beauty and animation, whilst the neighborhood (New Romney) is full of antiquarian and historic interest. The estate has been laid out with great care. A site has been reserved for a convalescent home. A golf club-house will shortly be erected, the links extending upwards of three miles in length. Sites are also fixed for a church, bank and general post-office. As the Southeastern Railway Company have resolved to co-operate with the projectors of the scheme in an unusually liberal degree, its success ought to be fully assured.

SOCIETIES

INDIANAPOLIS CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

THE Indianapolis Chapter of the American Institute of Architects announces with extreme regret the death of one of its members, Mr. D. A. Bohlen, a Fellow of the former Institute, and President of the Indianapolis Chapter during two years. Mr. Bohlen was born in 1827 in Kattenberge, Hanover, and came to America in 1850. After having travelled over the United States and Mexico he made Indianapolis his home and resided here about thirty-five years. Though confined to this State, his practice as an architect solely was extensive and his works throughout show most scrupulous care in design and construction and they are of more than ordinary merit. Mr. Bohlen was well-known as a very studious scholar of exceptionally high attainments. His integrity in general and his conscientiousness in the practice of his profession were such that he was much honored and looked upon as a criterion by both layman and architect.

COMMUNICATIONS

[*The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.*]

SUGGESTIONS FOR IMPROVING BUILDING METHODS.

BOSTON, MASS., June 7, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I regret that the terms that I used in my comments upon the hollow roofs, "foolishness and ignorance," should have been imputed to architects. It is the foolishness and ignorance of *owners* in most cases that put the architect at a disadvantage, and cause so much loss by bad construction.

In the matter of the plaster-board. In mill practice very little use is made of plastering. The defence of ceilings has been customarily brought about by the use of other materials. It, therefore, happens that "the similar combinations of plaster and fibre" which you name as having been specified by architects "for fifteen or twenty years, at least," had never been brought to my attention; nor did they appear to be known by the gentlemen who had brought the plaster-board to me, whose experience has covered very many years in the construction of buildings of every class. Would you kindly name to me the combinations and give the specifications. We have often been consulted, not only by builders, but by many architects on this point, and it, therefore, occurred to me that general attention might well be called to this material technically named as "plaster-board" which has been brought here from Germany, and is now being introduced in this country. Two or three architects in considerable practice in Boston who happened to have seen for the first time the samples of plaster-board that we have at our office, looked upon the material as quite new, and as likely to have a prominent place in the construction of dwelling-houses.

I also venture to say that the rightly constructed plank roof can be placed upon a city building at less cost; that is to say, without "the extra expense of plank-roofing" named by you, as compared to several of the methods of constructing hollow roofs to which my attention has lately been called.

I venture to make one other comment in rejoinder to your memorandum. In reference to owners you say that "most of them prefer both the level ceiling furred down from the roof, *which must slope to throw the water off*, and the air-space." Now I venture to ask why a roof must slope to throw the water off, if it is constructed of solid timbers and stiff plank? Is not the slope even of half-inch to the foot commonly called for, only in order to prevent puddles collecting which are due to the sagging of the slender or thin materials commonly made use of? If a roof is constructed of sufficient strength, is there any absolute reason for a slope of any kind? According to my experience snow will blow from an absolutely flat roof where it may collect even on a pitch of half-inch to the foot.

The problem of one-story school-houses has come up of late, where there is plenty of room to build them, and I have ventured to suggest that the roof of a one-story school-house, divided into many rooms and therefore well sustained by frequent partitions, might be made perfectly flat; the seams caulked as in the deck of a vessel; the roof covered with well prepared duck, and then made use of for a play-space in muddy or snowy weather.

The one-story mill of most solid construction, 400 feet long and 75 feet wide, with monitor lengthwise, can now be built in this neighborhood on level, gravelly ground, for seventy cents per square foot of floor or less. It has occurred to me that partitions could be put up either of the plaster-board between studs or finished with the adamant plaster, which is now coming into common use, at a very moderate cost, carrying the whole cost of the building perhaps to one dollar per square foot. I am inclined to think that this would be the most useful, best lighted, best ventilated and wholesome school-house that could be constructed, and I doubt if thirty thousand available feet of floor-space can be provided at as low a cost in any other way. If the building were made only fifty feet wide, the monitor would not be required; then the flat roof would give a play-ground or play-space of twenty thousand feet on a building of 400′ x 50′. I should be glad to have you submit your comments upon this somewhat audacious proposition. Very truly yours,

EDWARD ATKINSON.

[ABOUT fifteen years ago a patented material called Fibrous Plaster was introduced in New York and Boston, which has had an extensive sale, but seems to have gone out of use of late. It had the appearance of a loosely woven bagging which had been saturated, so to speak, with plaster-of-Paris or mortar. It was made in sheets, which were screwed to the underside of beams or furring, and finished with a skim coat or hard finish. Our impression is that there have been various things of nearly the same sort in the market since. More lately, the Chalmers-Spence Company has introduced a wire netting, buried in asbestos cement, which we have used in a similar way, with satisfaction. As to the hollow roof, sloping above, the experience of most architects is that some slope is absolutely necessary, with any roofing material, and with roof-beams of any strength. Unless the water runs off somewhat quickly, it will freeze to the roofing, and tear it to pieces, if of solid material, or rot or rust it out, if of tin or composition. Moreover, the pitch must be sufficient to drain the water from the rough surface of tar and gravel, and out of the depressions caused by the expansion and contraction of tin plates—say one-quarter of an inch, at least. If the ceiling inside follows the same slope, the rooms look badly, and, if finished, as in an office-building or tenement-house, will not bring so high a rent as if their ceilings were level. Hence, the air-space made by furring down, is not merely a superstition, but a financial circumstance. Whether duck roofs would remedy the difficulty is considered uncertain by architects. We have known them to stand very well in some cases, while in others, where the same materials were used, and the same care, they lasted only for a short time. The suggestion for a one-story school-house is an excellent one, well worth working out.—EDS. AMERICAN ARCHITECT.]

PLASTER-BOARD.

BOSTON, MASS., June 12, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I am informed by the American Plaster-Board Company that my statement as to the use of the "cat-o-nine-tails" in the plaster-board, is an error. I got this impression from one of the builders who has adopted this plaster-board in a large way.

The material which is made use of is a reed of a different kind, possessing a glazed surface. The reeds are found in New Jersey, and are practically the same as those which have been used in Germany, which are principally obtained from Holland. They are said to be very tough and strong. The makers of the board have substituted for hair a vegetable fibre which is much stronger; therefore both the longitudinal strength and the transverse strength are said to be very much greater than in any samples which I have yet seen.

I think the subject is one worthy of investigation, and I am still of the opinion that it is substantially new as compared to any of the substances to which you have referred as having been in use for the last fifteen or twenty years. Yours very truly,

EDWARD ATKINSON.

ARCHITECTURAL SCHOOLS.

WACO, TEXAS, June 12, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I have been a subscriber for the *American Architect* for several months, am a boy in an office learning the business and wish that you would favor me with a list of the architectural schools in the United States, and which you think are the best, for I am thinking of taking a school course. Yours very respectfully,

GEO. HUGHES.

[THE Architectural Department at the School of Mines of Columbia College, New York; the Architectural Department of the Massachusetts Institute of Technology, Boston; the Architectural Department of the Illinois State University, Champaign, Illinois, and the Architectural Department of Cornell University, at Ithaca, N. Y., are the principal schools of architecture in this country. All of them are good.—EDS. AMERICAN ARCHITECT.]

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THE RECOGNITION OF THE ARTIST.

HARTFORD, CONN., June 25, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT: —

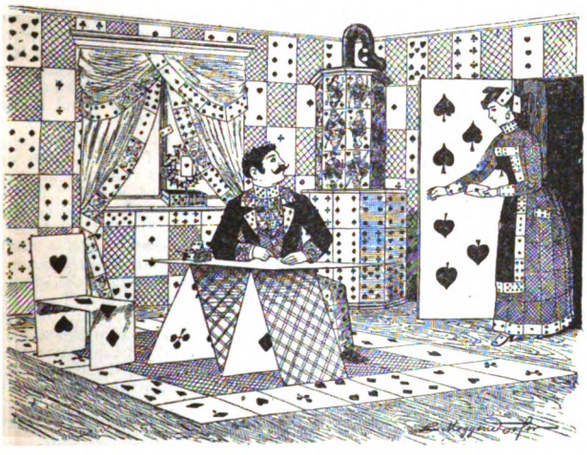
Dear Sirs, — In illustrating the Garfield Memorial, I think it would be well at the same time to call attention to a marked compliment paid to the profession by Ex-President Hayes, who presided at the dedication. Usually on such occasions the architect is ignored or placed at the tail end of the procession, but at this dedication President Hayes purposely placed the architect in the centre of the circle on the platform, next to the orator of the day. It was not the intention of the Master of Ceremonies to so honor him, as there was no chair reserved for the purpose, not that any discourtesy was intended, but he was simply following the time honored custom of ignoring the architect. This is not the first time that President Hayes has shown his good taste on such occasions. When Quincy Ward's statue of General Thomas was about to be unveiled at Washington, President Hayes took pains to show to the assembled multitude that the artist had some claims to their approbation, as well as the crowd of distinguished persons on the platform.

It is not vanity that prompts me to write this, but to call attention to the glaring indifference usually paid to the artist or architect on occasions of this kind, in this country. Abroad, the custom is quite different. I have a photograph of a painting in the Luxembourg Gallery, by Detaille, depicting the opening of the Grand Opera House. On the first platform of the magnificent grand staircase are grouped the officers of the government, but Garnier, the architect, with true French politeness is given the place of honor, while all the beauty and chivalry of France salute him as they ascend to the foyer. When the Hartford Soldiers' Memorial was dedicated, the architect and the two sculptors, Messrs. Kitson & Buberl, drove together in a hack at the very tail end of the procession, surrounded by small boys, advertising wagons, and the rag-tag-and-bob-tail generally. Yours truly, GEORGE KELLER.

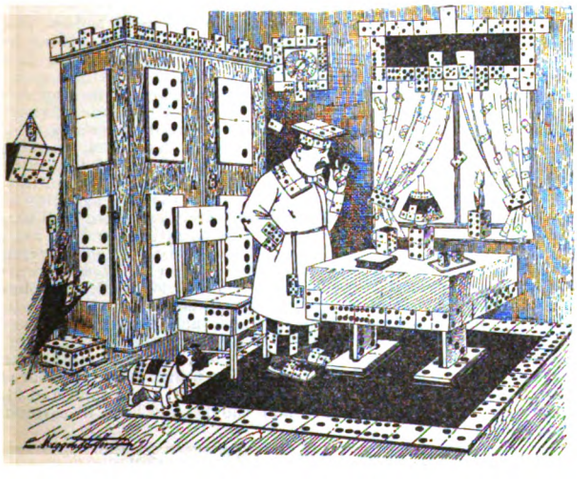
NOTES AND CLIPPINGS

SOME SUGGESTIONS FOR THE FURNISHING AND DECORATION OF ROOMS SUITABLE FOR DEVOTEES OF THE GAMES INDICATED.

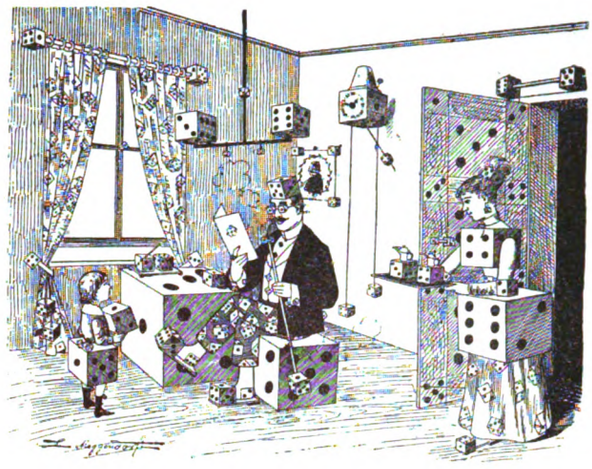
Cards.



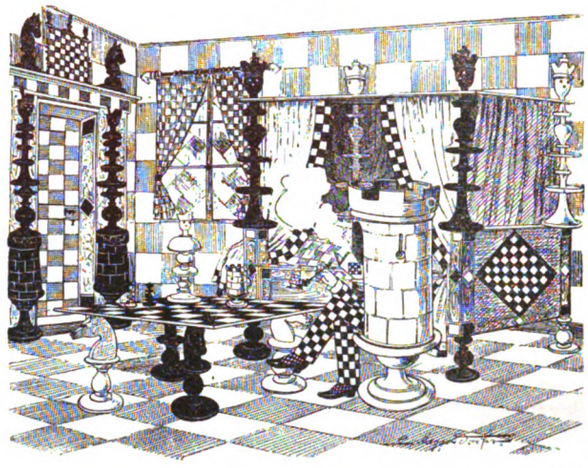
Dominoes.



Dice.



Chess.



From *Fliegende Blätter.*

THE architect who draws good houses should certainly go upon the stage. — *Chicago Post.*

THE DIFFICULTY OVERCOME. — Wife — "Why, my dear, the architect said this dining-room would seat thirty-five people, and it will not seat half so many. What are we going to do?"

Husband (charitably) — "Really, darling, I don't know, unless we go out and sit on the architect's design." — *Lawrence American.*

EXACTLY LIKE THE BUILDING. — "Dinguss," said Shadbolt, as the two met in front of a hotel, "they say that this building is settling. Can you see any indications of it?"

"No."

"That reminds me, Dinguss, by the way, that you haven't settled for that last $10 you ——"

"I'm just like this building, Shadbolt," said Dinguss, sadly "I can't see any indications of my settling." — *Chicago Tribune.*

AN HONEST ARCHITECT. — Caller — "I have $10,000 to put into a house, and I wish to select a design." Honest Architect — "Yes, sir. 'John! Show the gentleman the plans of our three-thousand-dollar houses.'" — *New York Weekly.*

THE POOL OF BETHESDA. — Consul Henry Gilman, writing to the State department from Jerusalem, gives the following account of the discovery of the pool of Bethesda: Of the more remarkable discoveries in the ancient city during the year, that of the Bethesda is of paramount interest and importance. As is well-known, the Birket Israel has in the past been considered as the site of the Bethesda; but the excavations of the Algerine monks under the ruins in the rear of the Crusader Church of St. Anne have gradually transferred opinion in favor of the latter locality. This was strengthened by the discovery of a rock-hewn pool containing water beneath three successive structures. Subsequent excavations revealed the remains of two tiers of five-arched porches, the lower tier being in the pool. The intelligent labors of the monks who are in charge of the property have been further rewarded by the recent discovery of another pool containing a good supply of water to the westward of that first discovered, the entire agreeing with the descriptions of the Bethesda as given by the fathers of the church and Christian pilgrims and writers as early as the fourth century. The correspondence in number of the five porches to those mentioned in the gospel of St. John (v: 2) will not escape notice. Steps cut in the rock lead down into the water. An ancient Christian

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church in ruins surmounts the whole. The remains of the upper tier of porches extend above the pool at right angles from the north wall of the crypt beneath the church, in which the apse, at the east end, though dilapidated, is still distinctly defined. On clearing away the débris that choked the fifth porch westward of the apse all these discoveries culminated in revealing the remains of a painting or a fresco upon the plaster of the wall in the rear. This discovery was made just before Easter, or about April 18, last. The fresco represents an angel as if descending into and troubling the water, which latter is depicted by conventional zigzag and wavy lines of an olive green, shaded with black, more suggestive of Egyptian hieroglyphics than of modern art, and surrounding the figure on every side. The right hand of the angel was shown as uplifted; but this has been carefully destroyed, probably by the Moslems, after their habits, in the early days of their power. So, also, the face of the angel, which has been battered so as to be completely obliterated. The glory or nimbus above the head, painted an orange yellow, still remains, but little injured. The edge of the pool appears to be indicated by a broad, red line inclosing the painting, and having an occasional rectangular projection into the water, perhaps representing steps or the piers for the porches. On the east of this fifth barrelled arch (the wall extending at right angles) are remains of another figure, also in fresco, much defaced, and supposed to represent the Saviour. Above the head, evidently intentionally mutilated, is a portion of the nimbus, and in the lower outer corner of the painting, part of a blue robe. It is to be regretted that these frescos, the colors of which were quite bright when first uncovered, have since greatly faded, so that the blue is now a dull, ashy gray. The reds and yellows, however, though lowered in tone, preserve their hues somewhat better. To summarize, these discoveries are as follows: First comes the rubbish covering the ruins, and built upon by the more or less modern Turkish houses; next beneath is the small church, with apse; under this the crypt, with five porches, containing the frescos; and, fourth and last, underneath all is the pool itself, cut in the solid rock, and with five arches of well preserved masonry. This last, from the historical and other evidence, I have not the slightest doubt is the veritable pool of Bethesda. — *Boston Herald.*

Church Architecture in New York. — The citizen who has dwelt in Gotham for half a century or so has had opportunity to mark the successive changes in architecture, both of public and private buildings, which have marked different decades. One is particularly struck with it in regard to churches. For full a century previous to 1840 the Grecian style of architecture prevailed, and St. Paul's church, on Broadway, with its Doric columns, built in 1766; St. John's church, on Varick street, erected in 1807, and preserving the ancient Grecian front; St. Peter's Roman Catholic church, on Barclay street, with its white marble portico and pillars dating back some seventy years, and the Dutch Reformed church, on Lafayette place, with its massive Ionic columns of gray granite, are fine specimens of this taste in church art, while the Roger Morris mansion (afterwards occupied by Madame Jumel, widow of Aaron Burr), which was built in 1770 and is still standing at Tenth Avenue and 161st Street, is a noble specimen of the old colonial mansion of Grecian style, sporting its pillars and pediment, such as used to dot the banks of the North and East rivers. With the erection of Trinity church in 1840 a reaction set in in favor of the Gothic style in architecture. It is amusing to recall the objections made to this noble edifice at the time of its construction. It was "High Church," "Puseyite" and "Popish." But since that time one denomination after another has taken up the Gothic style, until you can no longer tell an Episcopal church from a Baptist or a Methodist, and Dr. Hall's Presbyterian cathedral on the avenue is one of the noblest specimens of Gothic architecture in the city. About the same time, too, a change of front took place in domestic architecture, and cheery brick was relegated to the background, while gloomy brownstone fronts were decreed by authority to afford the only decent habitations for families of wealth and fashion. — *Philadelphia Record.*

Venice and Stolen Property. — Venice, in fact, is one vast museum of stolen property. A self-righteous inscription over the gateway of St. Mark's informs the visitor, with much show of conscious probity, that the four famous antique bronze horses above the portal, "removed by the rapacity of the enemy to Paris" under Napoleon I, were again restored to their proper place by that incorruptible champion of strict international morality, the Emperor Francis. But the glorious team, a work of the sculptors of the Neronian age, had previously been stolen in the thirteenth century by the Doge Dandolo from Constantinople, whither they had been carried from Rome, for his own glorification, by Constantine the Great, who had filched them himself from the triumphal arch of Trajan, who in turn had borrowed them, as seems probable, from the similar monument of his predecessor Nero. Such are the humors of the world and the whirligigs of time. Indeed, if every man had his own again, one might almost say there would be no Venice. The column of St. Mark's with its winged lion would go back to Syria; the square pillars by the Doge's palace would return once more to St. Saba, at Ptolemais; the alabaster supports of the inner canopy would find their way back, men say, to Solomon's Temple; and even the mouldering body of the Evangelist itself, which reposes beneath its pall of gold and jewels below the high altar, would have to migrate to the community from which it was first filched, the Coptic Christians of Alexandria. — *The Cornhill Magazine.*

Discovery of an Aztec City. — The announcement is made of the discovery of another forgotten Toltec or Aztec city in Mexico. The site is in a mountainous district of the State of Vera Cruz which does not ever seem to have been visited in modern times save by Indians. The ruins are now hidden by trees and underbrush. Some of the buildings were four and five stories high, and the cornices and windows were skillfully and artistically worked out. The sides of the buildings were frescoed in colors that appear as bright as the day they were painted. Many inscribed slabs of stone were found. Mr. Leopold Batres, inspector and conservator of the archæological monuments of the republic, considers the discovery the most important of the kind in many years, and proposes to visit the ruins immediately to prevent the loss and destruction of valuable relics. — *The Illustrated American.*

Discovery of a Catacomb in the Crimea. — A few days ago an interesting catacomb was discovered at Kertch in the neighborhood of the Tahtar quarter. The catacomb in question lies about fifteen feet under the surface, and is divided into three compartments. It is decorated with frescos representing Hermes surrounded by winged genii, and also with scenes taken from domestic life. The most interesting discovery of all was an inscription, part of which forcibly reminds the reader of the one over Shakspeare's ashes. It runs: "Sorak who never threw away the bone of the poor has raised for himself this sanctuary, and adjures all people that his bones were not robbed and defiled." This adjuration to posterity has been without effect, for the catacomb was already found to have been plundered. — *English Exchange.*

Sevres Porcelain. — Even the historic Sévres porcelain manufactory is threatened with being gobbled by an English syndicate, said to include some of the more important china-makers of Great Britain. Of late years the product of the Sévres works, which always have been under the direct control of the French Government, has been steadily running down in public esteem. The manufactory has received an annual subsidy of something more than $100,000, but a commission has reported in favor of abolishing that. The annual sale of porcelain produced at Sévres now scarcely exceeds $20,000. — *N. Y. Sun.*

An Historic Clock. — A representative of the Rothschilds has secured the historic clock of Louis Quinze workmanship which has been for many generations at Milton Hall, Northamptonshire, one of the seats of the Fitzwilliam family. The price paid was £30,000. The clock is said to have been a wedding gift from a foreign prince to a former Countess Fitzwilliam. It stands fourteen feet high. — *Commercial Advertiser.*

TRADE SURVEYS

Once more foreign capitalists are exhibiting confidence in certain American railway securities, and a score of schemes are now on hand looking to the transfer of European capital into these channels. Home capitalists are placing their money in many other directions, such as in manufactures, engineering enterprises, in land speculation, etc. This inflow of foreign capital will probably continue and become one more favorable factor in the general industrial prosperity. Among the recently announced schemes are two ship-yards and four steamship lines. Among important inland movements may be mentioned the construction of about one thousand miles of oil and natural-gas pipe-lines, the projection of seven blast-furnaces, four rolling-mills, twenty-five hundred miles of railroad and the prosecution of a very large volume of work in the way of railway facilities, lake craft service, manufacturing extensions, and so on. Prices continue strong in all lines; copper has reached 17 cents on its upward march. There is activity in all the metals. The American iron trade is on a solid basis and production is under control. Crude-iron production is 180,000 tons per week. Foreign crude-iron stocks have declined 351,529 tons in five months. Lake ores are in demand. Steel-rail contracts are reaching American mills. Textile manufacturing interests admit a fair June demand. Hosiery interests are not restricting production as a whole. Hardware, nail and barb-wire manufacturers are able to keep entire capacity employed. Cotton is in active demand in all American and foreign markets, and prices are firm. Wool buyers are liberal purchasers in all markets. Wool prices are declining slightly abroad on account of the pending tariff legislation. Lumber distribution, so far this year, is roughly estimated at 10 per cent over last year at same time. Anthracite coal output is at the same figure. Eastern shipments of bituminous coal and coke from Pennsylvania and Virginia fields is 1,461,518 tons in excess of shipments at same date last year.

Reports for the past two weeks from builders in large cities indicate that there has been an increase in the number of permits, and a general increase in the preparations for building work during the third quarter of the year. Much new work is coming up, especially shop and mill extension. The demand for machinery and electrical equipments, light and heavy, is said by manufacturers of electrical equipments to have reached the highest limit ever known. A great deal of machinery is being practically cast aside by later improvements, and this is quite an item of expense in many cases. The pressure on machinery-making capacity is very great, and new machine-shops with a capacity for turning out unusually heavy machinery are to be erected in New York, Pennsylvania and Ohio during the coming six months. Financial authorities are agreed that existing trade conditions are favorable. Railway managers, speaking for Eastern railway interests, say that traffic will increase, and that rates will be easily preserved. Commercial authorities do not apprehend any disturbance to credits or to confidence, and believe that the agencies now at work will keep production and consumption nicely balanced. All business interests are anxious for a disposition of tariff agitations, and are averse to the agitations of political issues likely to disturb existing friendly relations. The indications are that production can be safely expanded in iron, coal, lumber, textiles and in building material. There is a sufficient volume of currency in circulation, and commercial paper is promptly accommodated everywhere. In the newer States, business and manufactures are encouraged by increasing banking facilities, by equitable freight rates, and by the quick handling of products and accounts. In labor circles, there is but little to disturb confidence. The two great branches of the labor army, or rather, their leaders, are snarling at each other. The rank and file are more anxious to work than fight, and the leaders have discovered this growing inclination.

S. J. Parkhill & Co., Printers, Boston.

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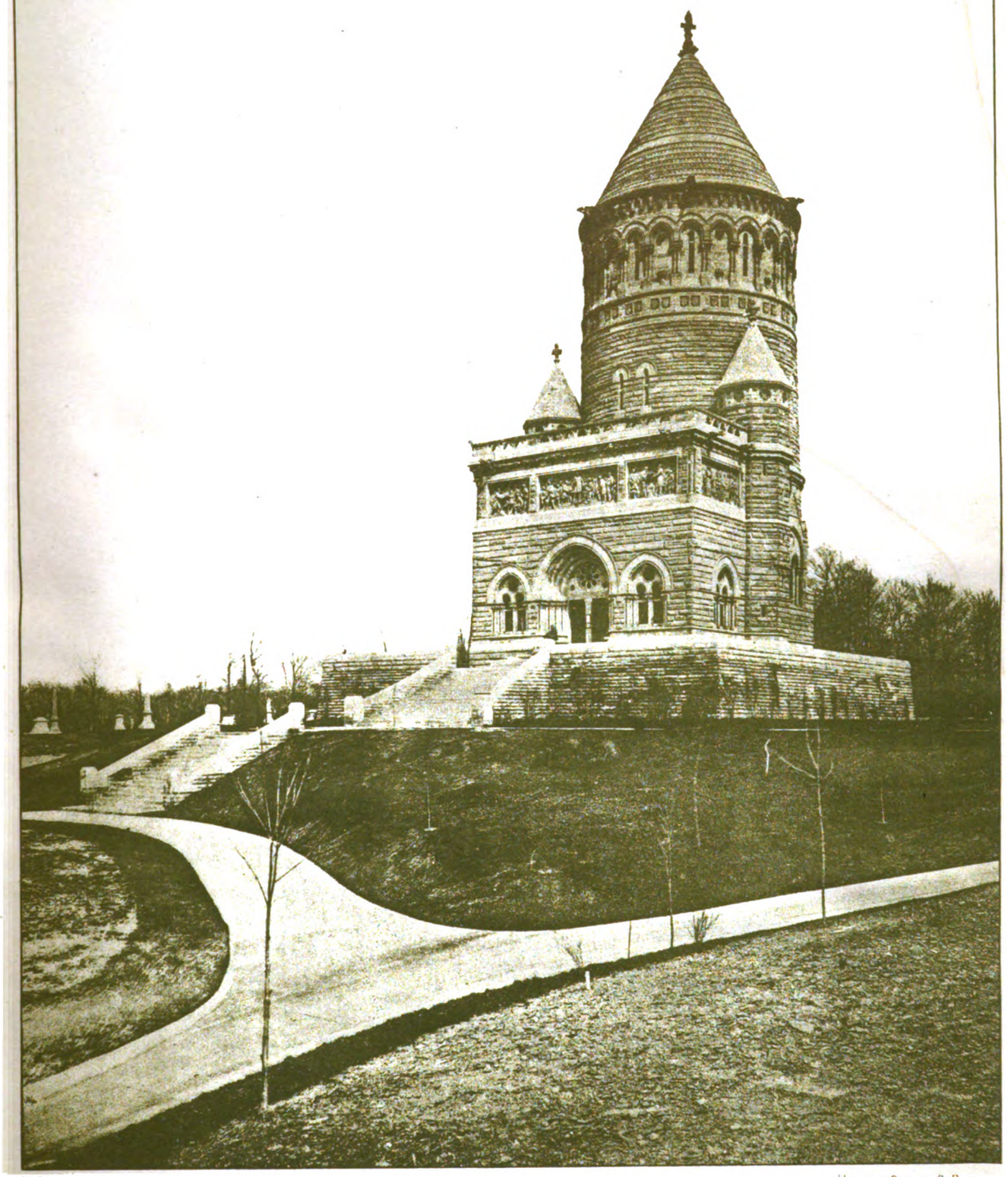
THE GARFIELD MEMORIAL. CLEVELAND, O.

GEO. KELLER, ARCH'T.



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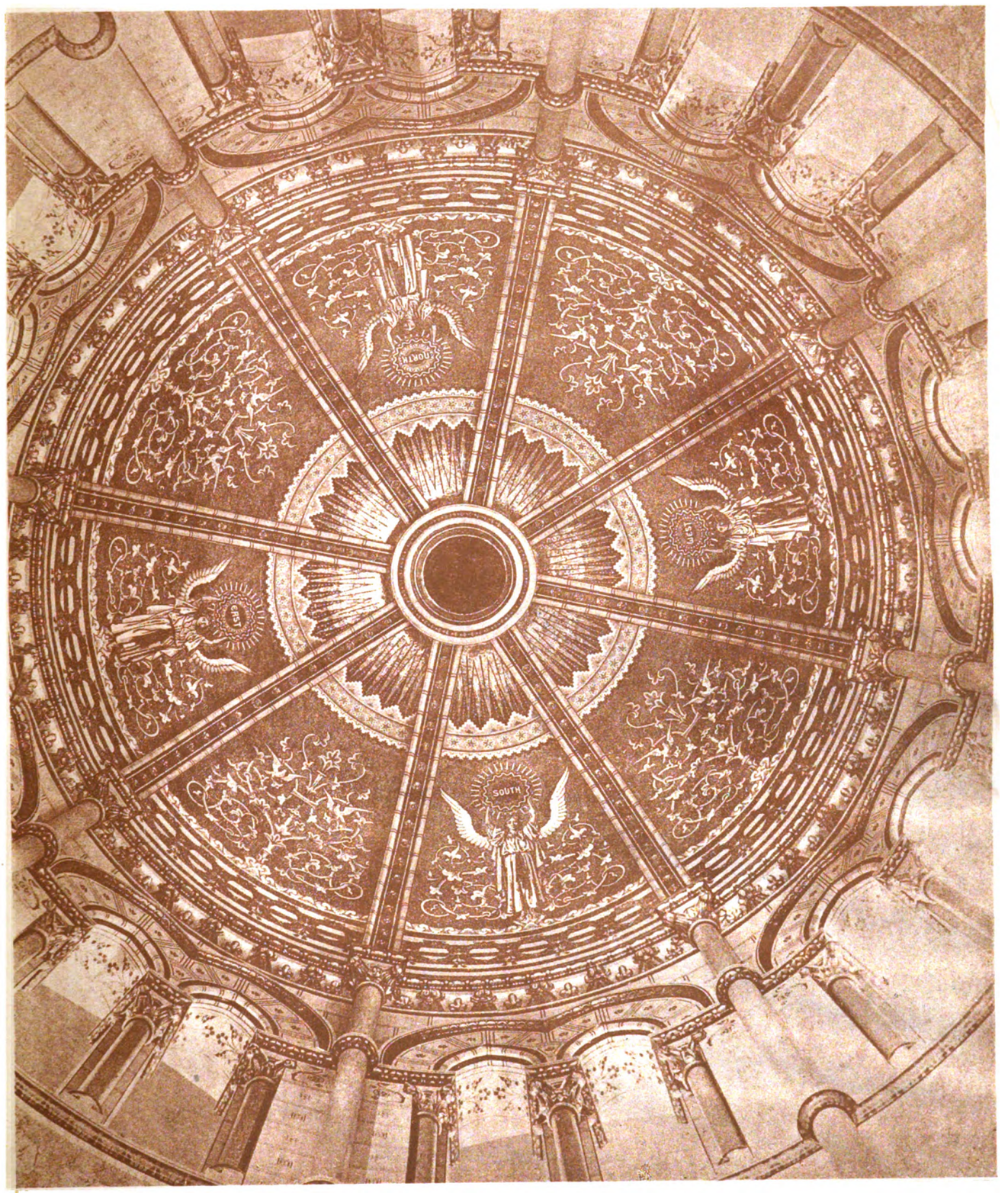

THE GARFIELD MEMORIAL.

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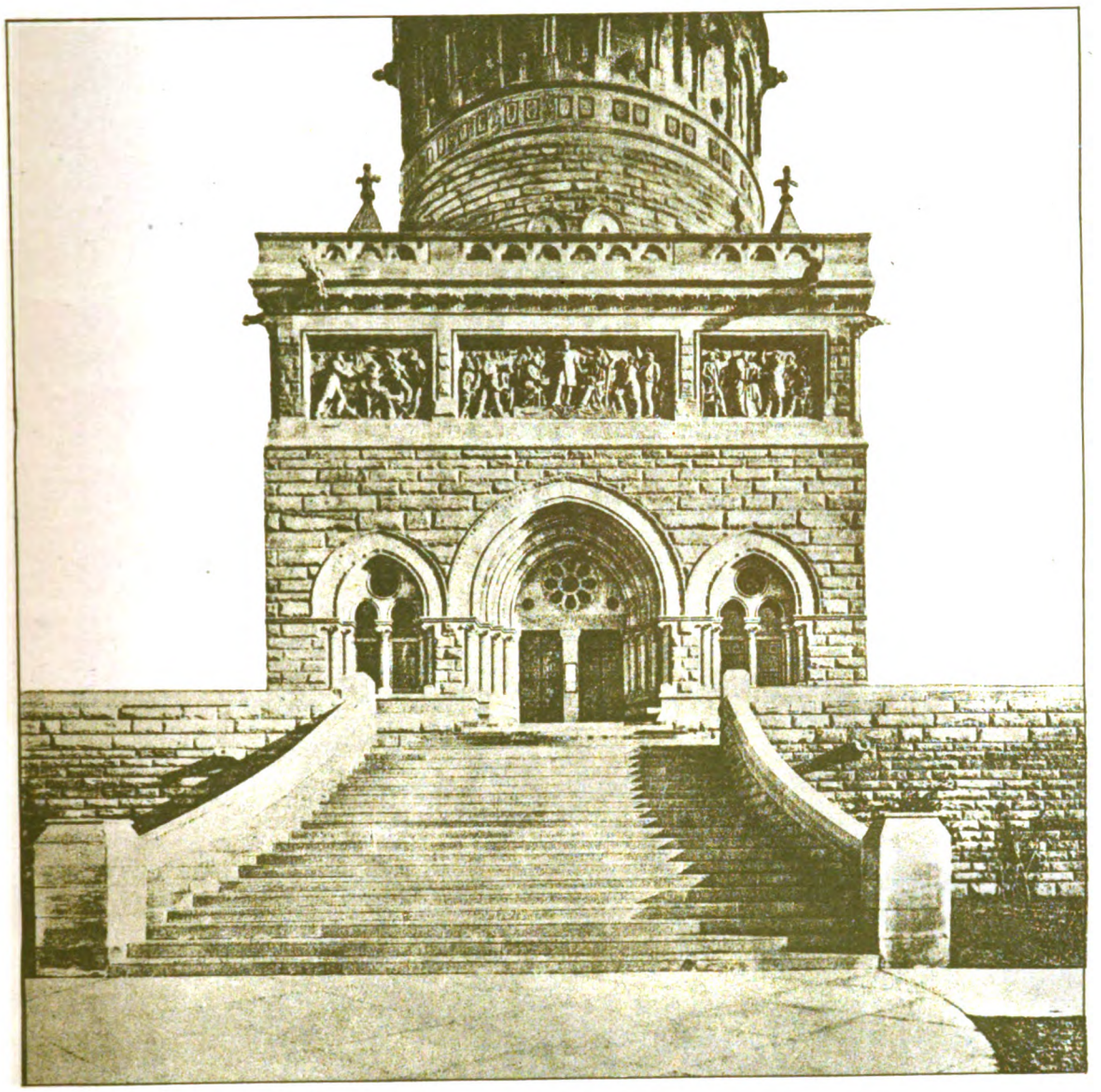

ENTRANCE.

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THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 91. SATURDAY, JANUARY 4, 1890. VOLUME XXVII. No. 732.

IMPROVED SKYLIGHT.

In the accompanying illustrations we show the general construction of an improved skylight which is being placed upon the market by G. F. C. Kloeppinger, of Toledo, Ohio. In offering it to the trade the manufacturers call attention to the fact that the skylight is made entirely of metal, that no lapping of the glass is necessary, that broken glass may be easily removed and new panes substituted and that the air circulation is such as to keep the glass dry and free from condensation. Referring to Figure 1 of the cuts, K is the ridge-piece, L the fasteners for the meeting edges of the panes of glass, B is a ventilating-flue and I

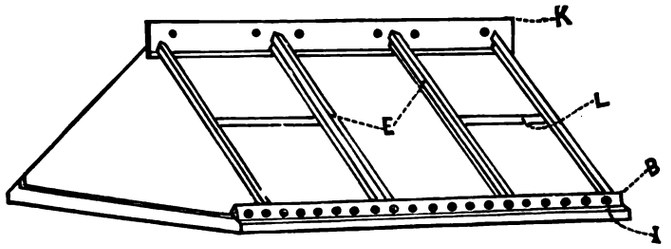

Fig 1. General View of Skylight.

ends of the fastener resting upon the upper edges of the chamber H, Figure 4, in such a way that any moisture in the gutter formed beneath the junction of two lights of glass may pass into the gutter G of the skylight-bar and thence to the eaves. The ventilating chamber H, extending the entire length of the skylight bar, is provided with a series of

Fig. 2. View of Skylight Bar in Position.

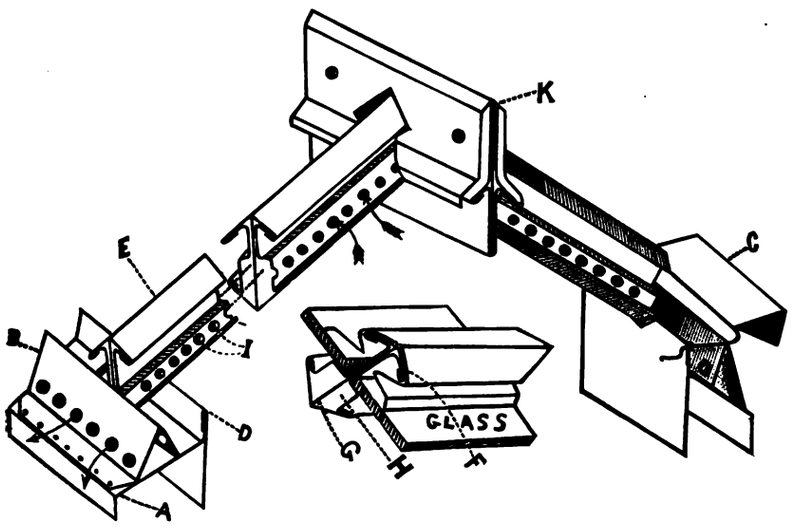

Fig. 4. Section of Skylight Bar.

perforations for the egress of foul air. Figure 2 shows a skylight bar in position, the general arrangement of parts being clearly indicated.

Fig. 3. Method of Joining the Glass.

In Figure 3 is shown the manner of joining the glass when more than one light is necessary to complete the length of the bar. It will be observed that the fastener consists of a hook-shaped piece of metal which fits tightly over the upper edge of the lower pane of glass and is bent down in such a way as to form a gutter to carry off the moisture. Each fastener is of a length to fit between two bars, as indicated by L in Figure 1, the openings for the free circulation of air. The manufacturer claims that the arrangement of the ventilating-flues is such as not only to ventilate the building on which the skylight is used, but also to keep the glass free from moisture, or the water from freezing upon the surface. When the draught through the ventilating-flues is too great it may be checked by means of a damper, shown at C in Figure 2. This consists of a hinged plate so arranged as to open or close the perforations, as may be desired. One of the features to which attention is specially directed is the arrangement of perforations directly under the glass, allowing the heated air to escape through the hollow bar and the ridge-piece K, Figure 2. It is also stated that in the construction of this skylight no extra machinery is required, that there is no solder exposed on the outside of the skylight and that all caps are either slid on to the bar, or else put on with bolts, as shown by the ridge-cap. The manufacturer speaks of the growing demand for this form of skylight, many thousand feet having been made in Toledo during the past year with very satisfactory results.

The patent was granted October 8, 1889, to Messrs. Weis & Berndt, of which G. F. C. Kloeppinger, of Toledo, Ohio, has the entire control over the United States.

G. F. C. KLOEPPINGER,
TOLEDO, OHIO.

A PERFECT GAS-REGULATOR.

It is universally conceded by all who use gas for the purpose of illumination, as well as by those who manufacture and sell gas for such use, that under most conditions there is a great waste in consumption, as well as annoyance from blowing burners, smoking of ceilings, draperies, pictures, etc., and also the poisoning of the air by the escape of unconsumed carbon. Hundreds of inventors have endeavored to solve the problem of perfect combustion, with varying degrees of success, in most cases the results being absolute failures. The pressure of gas cannot be regulated at the gas-works. The superintendents and engineers can only succeed in maintaining a pressure that shall be sufficient for all, without being greatly excessive. Even this condition is difficult of attainment, because of the variation from hour to hour of the consumption, and the irregularity of street service and interior piping. It is freely acknowledged by most gas experts that the best method of control is by means of an automatic gas-regulator for each meter, which will hold the pressure at a given point, whether few or many burners are being used at the same time. But while there have been a few cases of partial success in the invention and construction of such devices, there have been so many scores of failures, that the public has become disgusted and engineers have grown sceptical in regard to their adoption.

We mean to be entirely frank and careful in the assertion that no gas engineer who has thoroughly examined the Rossney Gas Saver and Purifier has failed to give it endorsement in fuller degree than has been accorded to any other "regulator" or "governor." Even

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more — no gas engineer has ever taken the pains to examine its construction without being forced to the confession that it did not seem possible that it could be "stuck up" a gas engineer in New England who will say with gas-tar. Still further — you cannot find this of any other gas-regulator he ever saw or heard of. This difference can be made apparent in five minutes to any intelligent man of mechanical sense, and the reason for it is that the valve in the Rossney machine is seated in liquid mercury, and it is impossible to stick iron to mercury with gas-tar, while in every other gas-regulator the hard-metal valve finds a hard-metal seat, and two hard metals can be stuck together with gas-tar so firmly that ordinary gas-pressure will not separate them.

Therefore, the Rossney machine can be adjusted to a lower pressure than any other in special cases where extreme low pressures are needed, and that pressure will be maintained year after year, regardless of temperature or condition of weather. This claim of uniformity and permanency of control cannot be maintained by any of the so-called glycerine machines. Glycerine will grow thick and sluggish in cold weather, and thin and active in warm weather. Its affinity for water is such that it will grow in bulk at one time by absorption, and shrink at another by evaporation,— thus constantly changing the point of pressure, and rendering the machine an "irregulator." Besides, when glycerine in the dome seal of a governor becomes thinned out with water, it is liable to become siphoned out, thus breaking the safety seal, and allowing gas to leak into the cellar, where it is free to cause fire, explosions, and loss of life and property. This process of siphoning occurred in at least five glycerine governors in one day last winter, in Boston. One of these was in one of the large hotels, and another in a large and crowded hospital. Fortunately, however, they were discovered in season to prevent disaster, and the only fire and explosion which occurred on account of these five governors was in a mercantile establishment, where but few people were present. The dome seal — as well as the valve-seat — of the Rossney Gas Saver is of mercury, of such depth that it is constantly able to withstand as much as four times the heaviest pressure to be found in New England.

One of the Rossney Gas-Savers and Purifiers has been in use in the office of the *American Architect*, Boston, for many months, and while the company has no letter from the publishers, endorsing or recommending the machine, and while no permission has been given for a reference, we have no hesitation in referring, without permission, to this magazine,— because we have never been disappointed when we have referred to gentlemen who were educated in the direction of mechanical art — as those who conduct such a paper must be.

The Rossney Gas-Saving Company undertakes to prove its claim to every consumer, on such tests as will satisfy any unprejudiced customer, and even overcome the prejudices of those who have been annoyed — or, as many of them claim, "swindled" — by unsatisfactory machines. Inspection by the most sceptical is invited, and especial welcome is given at the office, No. 4 Liberty Square, to architects, builders, gas-fitters, engineers, and others who have given the subject of gas-consumption special attention.

There is no irregularity or inconstancy in in the action of the Rossney machine. It is as perfect and complete in its action as the touch of opposite pages in a new ledger, and as delicate in operation as the needle of a marine compass.

ROSSNEY GAS-SAVING COMPANY,
4 Liberty Square, Boston, Mass.

ENLARGEMENT OF THE CHROME STEEL WORKS, BROOKLYN, N. Y.

The Chrome Steel Works, of Brooklyn, N. Y., manufacturers of the well-known Chrome Steel, are full of business.

Their celebrated five-ply burglar and fireproof combination plates made of welded Chrome Steel and iron, used extensively in the construction of safes, vaults and jails, as well as the Adamantine battery-shoes and dies, rolls, crusher-plates, cams and tappets made by them and employed in the crushing of ore, have become exceedingly popular during the past few years. This has necessitated frequent enlargement of the works, and additional machinery in order to meet the increased demand for these goods.

We have from time to time noted in these columns, this steady advance, and take pleasure in directing our readers' attention to the fact that the proprietors are again about to further enlarge their works, which will give them still better facilities for meeting the demands of their numerous customers throughout the United States, Canada, Mexico, South and Central America.

The addition now being erected will cover the remainder of the Chrome Steel Works property fronting on Kent Avenue, between Keap and Hooper Streets, and extending back 204 feet.

There have already been added to their plant a new tubular boiler and one horizontal and one vertical engine, all of the most improved type. We are informed that when the addition is fully completed the office will be removed from its present location to the corner of Kent Avenue and Hooper Street. The officers of this progressive concern are Mr. S. H. Kohn, President; C. P. Haughian, Vice-President; and J. G. Dunscomb, Secretary.

CHROME STEEL WORKS,
Brooklyn, N. Y.

MORE ABOUT THE SASH-PULLEY PATENT WAR.

We mentioned some time ago the fact that Stephen Palmer, of Lansingburgh, had sued the Empire Portable Forge Company of the same place for the infringement of two of his sash-pulley patents, one of which the Empire Portable Forge Company claims to have a license from Palmer to use. Now we have another phase of this contest to chronicle, for the Forge Company has in turn sued Palmer for the infringement of the old Vetterlein patent, which it owns and which covers a sash-pulley made with rounded sides adapted to fit into a socket produced by a series of connectedly bored auger holes.

This Vetterlein patent which the Forge Company owns was granted in 1876, and broadly considered covers many of the sash-pulleys now made, and as the Forge Company and its experts say, covers the pulleys made by Palmer. The contest promises to be an earnest one. Esek Cowen is counsel for the forge company and Nelson Davenport counsel for Palmer. — *Troy, N. Y., Press.*

The Whittier Machine Company have recently put into the apartment-house, corner of Beacon and Dartmouth Streets, this city, two passenger-elevators upon the Pressure Tank system, and a complete steam-heating apparatus.

THE SPRECKELS SUGAR REFINERY.

A gentleman who was recently granted the unusual favor of a tour of inspection through the new sugar refinery of Mr. Claus Spreckels, at Philadelphia, Pa., says: "As far as one conversant with machinery, although having no particular knowledge of the refining of sugar, can state, this establishment seems to be from beginning to end the most carefully-planned and the most perfectly-built works that it is possible to conceive of. It is simply the acme, the perfection of mechanical skill. The impression created on the visitor's mind is one of maximum production with minimum labor. Everything, even to the shovelling of the coal and ashes, is done by steam-power, and only the mind of man is needed to guide and direct these stupendous forces which make the expected product possible. The mass of shafting, mitre wheels and pulleys that one is accustomed to in other sugar-refineries, are here notable by their absence. Even each centrifugal is served by its own respective engine. As each is started, it reminds one of the fussy, sputtering, bustling little steam-tug moving the fat, good-natured merchantman of aldermanic proportions about the harbor. Perhaps the greatest surprises, however, that Messrs. Watson, Müller and Sieghortner have prepared for the visitor, are the many unexpected, and at times almost absurd, locations of the engines. One runs against these at times in the most startling places. Little 5 and 10 horse-power Westinghouse Engines are perched up on brackets in the boiler rooms, for instance, to drive the mechanical stokers, and seem to do their work noiselessly and almost without attention. Engines are literally scattered all over the building, apparently without much regard to foundations; and one engine is mounted up among the timbers in the tower, whose duty it is to operate certain coal-conveying machinery, in a position that compels one to admire the nerve (we feel almost inclined to say the audacity) of the engineers who located it there." The daily papers announce that the first barrel of sugar refined in this magnificent establishment has already been offered for sale in the city of Philadelphia. It is, therefore, fair to presume that the works have been successfully started.

REDWOOD SHINGLES.

The use of Redwood shingles in California is greatly benefited by staining them with Dexter Bros. English Shingle Stain.

It is the only stain that has been found to keep them from turning black.

It will be well for our Eastern architects to remember this, as the redwood contains a degree of iron which will hasten to turn the shingles black when exposed to the weather. After it is black it never can be stained lighter.

The advantage of using this stain in southern California or other warm climates is that unlike paint there is no skin surface to peal off.

Paint will not last over a year in these climates whereas the stain will last years.

The dry atmosphere of Colorado has no effect upon it, and dipping of the shingle before the shingle is placed on the house prevents its curling. So the advantage of these stains is wonderful and they deserve the merit they have thus won.

DEXTER BROS.
57 Broad Street, Boston.

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THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

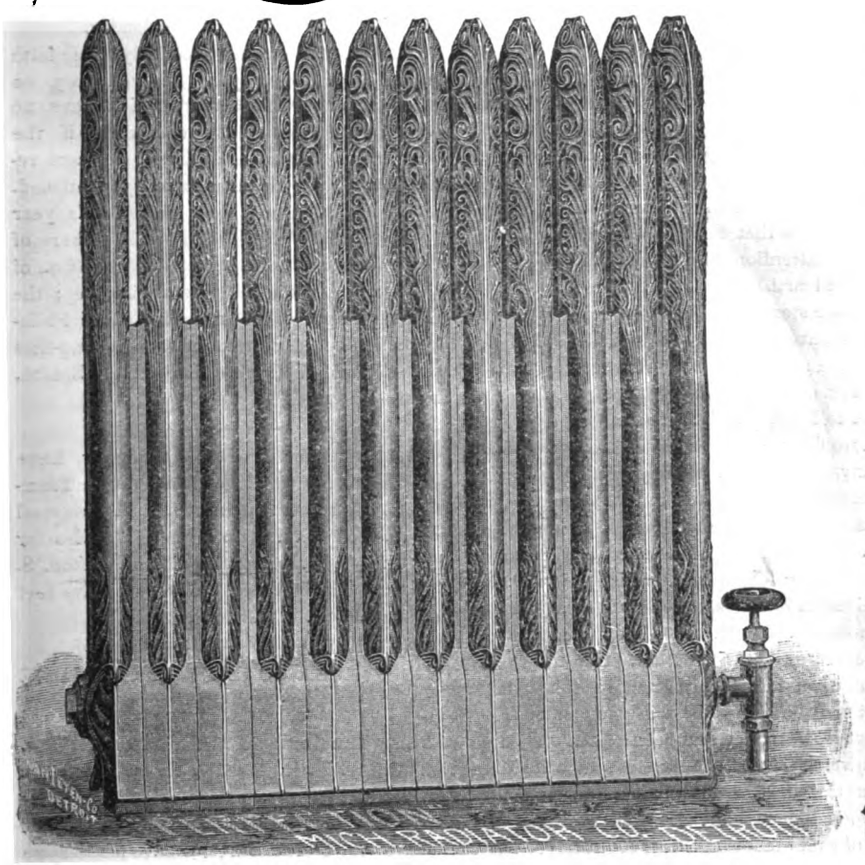
No. 92. SATURDAY, FEBRUARY 1, 1890. VOLUME XXVII. No. 726.

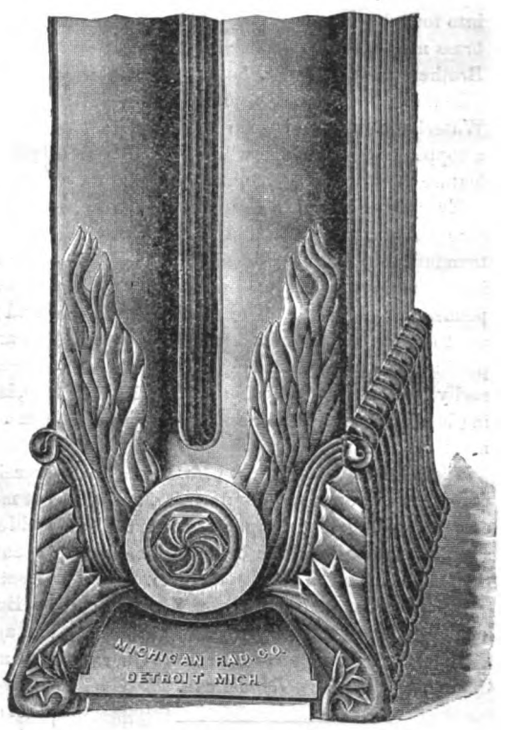
ILLUSTRATIONS.

PAPIER-MACHE ORNAMENTS BY J. N. LOMBARD, 58 BOWDOIN STREET, BOSTON, MASS.

STAINED-GLASS WINDOWS FOR ST. PAUL'S CATHEDRAL [R. W. GIBSON, ARCHITECT] BUFFALO, N. Y., MADE BY MESSRS. J. & R. LAMB, 59 CARMINE STREET, NEW YORK, N. Y.

PERFECTION RADIATORS.





"PERFECTION" DIRECT-INDIRECT.

THE front view shows the bottom of the loops so incased as to form a box, into which the cold air can be conducted from the outside of the house and the room heated by the Direct-Indirect method which secures Perfect Ventilation. Each section or loop of the radiator is cast with its part of base and flue, and when the sections are connected the flanges dovetail together and form a diamond-shaped flue with an area of six square inches. This improved method of construction compels the fresh air admitted at the base of radiator, to come in contact with the heating-surface over its entire length, and consequently the fresh air is brought into the room at an exceptionally high temperature. The end view discloses a damper door at either end of base, so that if desired when the cold air supply is shut off, by means of register in outside duct, the Radiator can be converted into the ordinary direct type by opening both damper doors, thus taking the air from the room instead of from the outside.

The damper doors also make it possible to easily clean the base of any accumulation of dust and dirt.

Each section contains 4½ square feet of surface, and occupies 2½ inches. Width of loops, 7¼ inches; width across bottom, 9¼ inches; height, 38 inches.

MICHIGAN RADIATOR CO.,
DETROIT, MICH.

RANDOLPH & CLOWES.

IT was just four years ago on Wednesday, January 1, 1886, that the machinery of Brown & Brothers big rolling-mill and tube-works stopped. Great was the mourning in Waterbury in consequence, for hundreds of workmen were thrown out of employment and an important industry had ceased.

There was in the employ of the concern as office manager a young man with a dash of gray in his hair, named G. H. Clowes. He conceived the idea that the business of the defunct concern could be resurrected. He secured the co-operation of E. F. Randolph, a wealthy citizen of New York, and soon, under the firm name of Randolph & Clowes, the tube and boiler department of Brown & Brothers works was opened for business. Mr. Clowes was the resident partner and the directing spirit, and under his management the business quickly grew to paying dimensions, and thereafter continued to expand.

Within a year Messrs. Randolph & Clowes further manifested their faith in themselves and their "eye for business" by buying the

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remainder of the Brown & Brothers estate which included a huge rolling-mill and other buildings suitable for the manufacture of sheet copper and brass. Bringing to their aid the practical experience of Mark S. Chipman, whom they made general superintendent, they proceeded to thoroughly reconstruct their mill property; as the result, in their works on Bank Street near the Naugatuck depot, they have one of the finest pieces of property of the kind in the country. Not only this, but with the machinery now being placed in the buildings they have a plant for the rolling of copper and of brass, and for the making of tubing, second to none in the United States in respect to quality and to capacity per man.

Two magnificent Corliss engines, made by the Watts-Campbell company of Newark, N. J., have been placed in the works, one of 400 horse-power for running the copper mill, and one of 600 horse-power for running the brass mill. The latter will not be ready for running for a month, but the former was started on Wednesday, with most gratifying results. Steam was gotten up, and at precisely 3 P. M. Mr. Clowes opened the throttle and the big engine began to move, slowly at first, then with constant acceleration until the desired speed was attained. Connected with the engine were a train of copper-rolls, and Master Mechanic Ferdinand Deming, as he watched them move, expressed great delight, saying that in every respect they fulfilled his highest expectations. General Superintendent Chipman was, of course, on hand, and his face reflected the glow of enthusiasm which lit up the countenance of Mr. Clowes. The engine was in charge of James Douglas, one of Waterbury's oldest and most experienced engineers, who with his corps of assistants, watched the big machine with all the solicitude of a mother teaching the latest arrival how to walk.

The floor space in Messrs. Randolph & Clowes mammoth works covers about 200,000 square feet. The works, as stated, are divided into four departments, viz., tubing, copper and brass mills and house-boiler factory. Brown & Brothers rolled copper, but in a small way. The new mill will be the only copper mill in Waterbury. There is soon to be put in also a copper-rod mill which will be another new feature of Waterbury manufacturing.

Everything has been done by the firm to secure permanence. Old buildings have had new foundations put under them, while new buildings have been constructed with a view to supplementing old ones. The machinery is the most modern and approved in all respects, and products of corresponding quality must necessarily be turned out. A fine brick office-building is nearing completion and will be an ornament to the city.

The Messrs. Randolph & Clowes are to be congratulated upon their enterprise, and General Superintendent Chipman upon the substantial manner in which he has accomplished the task assigned to him by the firm.

By the way, the engine started yesterday has been named the "Florence," after Mr. Clowes little daughter, Florence Guernsey Clowes. — *Waterbury Republican.*

REMOVAL.

PHILADELPHIA, PA., January 1, 1890.

Having removed to our new factory building, Nos. 1225, 1227, 1229 Callowhill Street, thereby enlarging and increasing our facilities for the manufacture of Thorn's Patent Metallic Roofing Tiles and Shingles, Patent Hip-Rolls, Ridging, Eaves-Troughs, Conductor-Pipes, Stamped Sheet-Metal Work, etc., we are prepared to fill all orders with promptness.

THORN SHINGLE & ORNAMENT CO.
PHILADELPHIA, PA.

CALENDARS.

The fashion of using calendars as an advertising medium seems to be on the wane, judging by the number that have reached us this year.

Very few of our own advertisers seem to have made use of the device this year, possibly preferring to spend their money on what the proprietors of newspapers and journals are pleased to consider more "legitimate" mediums. We are inclined to feel that they are right. These calendars must cost a good deal of money; that is, if they undertake to cover anything like the field that is covered by a fairly good class-journal, and if the same amount of money should be spent in legitimate advertising in a regular medium, the advertiser would probably be surprised at the display that could be made with such a sum and the consequent returns that would come from it.

But no: advertisers prefer to follow their own notions of what is the best course for them to pursue, and though manufacturers will spend one thousand dollars on a calendar which has to contend with a dozen or a hundred similar calendars which a given individual may receive, they would feel themselves fit subjects for a lunatic asylum if they should dream of paying the same amount of money to a single journal and be content to do no other advertising during the year. No, if they are willing to spend one thousand dollars on advertising they prefer to parcel it out amongst the greatest possible number of mediums, the result of which is that their advertisements are small when they might be large and impressive. The money is spent to be sure and the advertising is done, but it is questionable if it has been spent in the most judicious way.

In the daily papers, size is often of paramount importance, and though it is of not so much importance in magazines and journals, it is obvious that a larger card is more likely to draw attention than a small one, if the display and artistic quality of each card are of the same standard of excellence.

We have every reason to believe that if a manufacturer, after obtaining an estimate of the cost of the edition of the calendar he proposes to issue, would then abandon his project, and would spend the same sum on advertising in any good journal which presumably reaches the same class that he means to send his calendar to, he would find the step a very remunerative one. Take a case in point. There lies before him an assortment of calendars which the writer has received in his capacity of architect. One, or at most two of them will be kept and the rest will go into the waste-basket. Can the money spent upon those which receive this ignoble treatment be held to be wisely expended?

But if the money had been put into as large an advertisement in the writer's favorite journal as this money could procure, he would have impressed upon him every Saturday or the first of every month, the fact of the advertiser's existence, would learn to know in what goods he dealt in, and best of all would become familiar with his name and address. Then when the constantly recurring question comes he would not have to stop and ask himself, "Didn't I throw away last January a calendar that said something about this thing that I want?" In place of this the question would be unconsciously answered as soon as asked.

Some manufacturers try to overcome this difficulty by giving their calendars a permanent value.

Here is one sent out by S. Bowen's Sons of Philadelphia, to advertise their mortar colors. It has an iron frame and so may escape the waste-basket, for though paper-pulp is made of many things, iron has not yet been reduced to a state of cold fluidity.

Others seek to make them of continuous value by making the calendar-pads cover two or more years or by using a calendar that can be adjusted to suit any year.

Others seek beauty before all, as Mr. A. J. Bicknell, the advertising-agent, who adorns his with a helio-chrome print of Trinity Church.

Others employ bright and harmonious coloring, as do Messrs. Merchant & Co. of Philadelphia, metal-merchants, who send out a calendar so brilliant of color that its harmonious effect is a surprise till one notes in the corner the name of Marcus Ward & Co., as the printers. That explains all.

Some seek an artistic treatment only, as does the Smith & Anthony Stove Co., who this year abandon the admirable sketchy leaflets they have used for several years, but in place of them send out a larger card — the work of the same artistic hand — with the smallest apology for a calendar-pad attached.

Others combine oddity with artistic ingenuity as do John H. Pray, Sons & Co., while others successfully combine the advertising of their goods with the production of an artistic calendar. The most successful example of this kind is the calendar of the Jackson Architectural Iron Works of New York, who send out a dozen heliotype prints of specimens of their handiwork each one of which bears a novel monthly calendar.

Others, again, who are seemingly losing faith in the institution, spend their money on strictly utilitarian calendars which have no very great chance of preservation if the recipient of one of them chances to have received one of the calendars already mentioned. Such calendars have been issued this year by Messrs. Berry Bros., of Detroit, makers of hard oil-finish; the Abram Cox Stove Co., of Philadelphia, manufacturers of furnaces; the Thorn Shingle and Ornament Co., of Philadelphia, manufacturers of metallic roofing-tiles and W. H. Wetherbee & Co., of Boston, lumber-dealers.

The Whittier Machine Company have constructed for the Providence Cable Tramway Company, of Providence, R. I., two steel boilers, each six feet in diameter. Also for the Clifton Manufacturing Co., of Clifton, S. C., four horizontal steel boilers, each five feet in diameter.

IMPROVEMENTS IN DRIVING LARGE PERFECTING-PRESSES.

Manager Jones, of the New York *Times*, and Messrs. M. R. Muckle, Jr. & Co., of No. 608 Chestnut Street, Philadelphia (the latter conducting their experiments in the press-rooms of the *Public Ledger*), have made some improvements in the driving of large, fast printing-presses that are of great interest to newspaper publishers everywhere. All such presses are now fed from the web, and to secure impressions which will be clear, distinct and black, the roll or web of paper must first be thoroughly dampened with water. This process, of course, weakens the paper greatly, so that it tears easily. If too damp, the paper

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Architects' Tubes

Consist of two Tubes with Capped Ends which fit snugly together, preserving Plans, Drawings, etc. from dust, and ready for convenient reference.
Also Mailing Tubes of all description and sizes.

THE UNEXCELLED PAPER TUBE CO.,
29 Rose Street, New York.

almost falls apart by its own weight. It is a familiar sight in any press-room, when the printing is commenced, to see the machinery clogged with torn paper over and over and over again, necessitating many stoppages. It is also quite common to see the end of the room piled knee deep with torn sheets. A newspaper press does not need to run many hours in the twenty-four; but when it once starts, the quicker it can hurl off the edition the better. This is the great desideratum. Indeed, it is of almost vital importance. In any well-managed office, the forms are held open for important news until the last possible moment. The forms once locked, everything, from that instant, moves with a whirl and a rush. To the novice, it seems as though pandemonium were let loose and that the safety of this broad land hung on that one issue of that one journal. Peace is not restored, and the omnipresent printing-office cigar-stump resumed, until the clatter and the roar on the street below announces that the paper is out and the nation once more saved. Aside from the money value of the paper lost, in these frequent stoppages, before the press gets under way, the delay may easily, and frequently does, result in a failure to catch trains with packages of papers, to the utter disgust of subscribers and necessarily to the injury of the publisher.

The speed at which a large press may run is, therefore, largely dependent on what the web will stand in starting. The recent improvements referred to consist in the use of small Westinghouse Engines. Instead of driving all the machinery in the publishing house by one engine, the improvements consist in attaching a separate Westinghouse engine to the jack-shaft of each press. Thus each press is operated entirely independent of any other press in the room, and of any other machinery, as for instance, that used in stereotyping. When it is desired that the press shall start on an edition, the engine is started. They go off very slowly together, thus starting the heavy web of paper revolving without shock and without tearing. The speed is increased as the work progresses, evenly and regularly, until a rate is reached in this way that is utterly impossible in any other. No loss of paper results, no delays occur and no trains are missed. The capacity or speed of the press is, in effect, increased from twenty to twenty-five per centum and a corresponding saving of time is effected. In some offices the forms are held open longer, thus catching later news, and incidentally the same trains as before. Already a number of the most prominent newspaper offices in the country have provided themselves with Westinghouse engines arranged in this way.

THE Whittier Machine Company have recently put into the building occupied by Messrs. S. S. Sleeper & Co., No. 11 & 12 South Market Street, this city, a freight elevator operated by one of their No. 3 Belt Hoisting-Machines in connection with an electric motor.

AMERICAN ENGINES IN ENGLAND.

THE Metropolitan Electric Light Co. operates a number of large central stations in the City of London. One was recently equipped with an outfit of

4 — 14 & 24 x 14, Westinghouse Compound Engines.
2 — 10 & 18 x 10, " " "
1 — 12 & 20 x 12, " " "

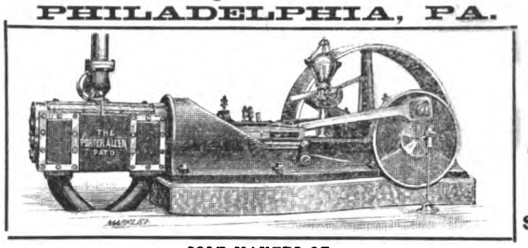
Another station operated in the same city by the same company is equipped with single-acting engines of English make. Quite a good natured rivalry exists, of course, between the men who are in charge of these stations. Recently, the American engines were put through their paces by British experts, on behalf of the Metropolitan Company, in a test lasting twelve hours without intermission. It was amusing to see the interest taken in this test by the American colony in London, many members of which spent the greater part of the day in the station. Even our respected Minister Plenipotentiary and Envoy Extraordinary, Mr. Lincoln, was on hand to see the American Eagle properly comforted and encouraged in its hour of trial. Being called away on important business, he returned at a later hour, in order to make sure that American interests and American dignity were being properly upheld. The engines in question are running regularly under a very heavy service, and the experts subjected them to many severe tests during the day; but they behaved so splendidly in all respects that the Englishmen were agreeably surprised. Some of the Americans who took such a lively interest in this test really know very little about steam engineering, but they were wildly enthusiastic at the way in which these engines upheld America's reputation for good machinery in London. Already orders have been sent to The Westinghouse Machine Company at Pittsburgh for

1 — 18 & 30 x 16, Westinghouse Compound Engine.
1 — 14 & 24 x 14, " " "
1 — 10 & 18 x 10, " " "
1 — 9 & 15 x 9, " " "

for the same London station, so that it is fair to assume that this type of Engine is giving satisfaction in the "tight little Isle." There are also vague rumors afloat, that the other London station of the Metropolitan Company, which is now equipped with English engines, will soon be supplied with Westinghouse Compound Engines from Pittsburgh.

Southwark Foundry and Machine Company,
PHILADELPHIA, PA.

BOILERS.
TANKS.
STEAM HAMMERS.
HEAVY CASTINGS.



BLOWING AND REVERSING ENGINES.
CENTRIFUGAL PUMPS.
STEAM PUMPS.

SOLE MAKERS OF
Porter-Allen Automatic Engine.
HIGH ECONOMY. DURABILITY. CLOSE REGULATION.

AMES MFG. CO.,
Bronze Founders
CHICOPEE, MASS.

Bronze Statuary of all Sizes. Estimates Promptly Furnished.

BOSTON OFFICE: 33 PEMBERTON SQ.

NOTES.

THE Whittier Machine Company have recently put into the building of Frederick L. Ames, corner of Lincoln and Essex Streets, this city, the elevator system, consisting of one passenger and eight freight elevators upon the pressure-tank system, together with a complete steam-heating and ventilating apparatus.

THE Joseph Dixon Crucible Co., Jersey City, N. J., closes 1889 with satisfaction. Our business has been larger in every branch than in 1888. Our chief new departure in 1889 has been in the large increase of equipment at our Graphite Mines at Ticonderoga. We have laid the lines there for a five-years' continuous run — tearing down and rebuilding almost everything much larger than before.

The specially large increase in the sales of Graphite Paint, Graphite Grease, Graphite Oils and other Graphite lubricants, has pushed us to this. The sales of our standard and well-known Dixon Stove-Polish, Dixon Crucibles, and Dixon "American Graphite" Pencils have also largely increased.

Our plant now includes five steam-engines with a total of 375 horse-power; nine steam boilers of 600 horse-power together, and the use of 150 horse-power water-power.

We employ 550 persons and our pay-roll averages $4,500 per week. We have direct connections with the telegraph companies and the Long Distance Telephone Co.

So far as we can see the prospect for 1890 is bright.

JOHN A. WALKER,
SEC'Y AND GENERAL MANAGER.

THE Whittier Machine Company have recently put into the Columbia Hospital at Washington, D. C., an hydraulic passenger-elevator operated by their pressure-tank system, together with a complete steam-heating apparatus.

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Something New for the Stable.

Read's Patent Harness Bracket.

An Article long wanted but never before made.

Holds the whole harness, takes no more room than the ordinary hook or peg, can be used for both single and double harness. Gives the harness-case a neat appearance, as it carries the harness up uniformly in width with the saddle, beside keeping the bridle and breastplate in their proper shape. They are neatly japanned, with gilt facings. Price $18 per dozen. Are now in use in over 100 first-class private stables in and about Boston.

Each bracket lettered "J. J. Read, Boston, Mass." For sale by dealers everywhere.

Indorsed and approved by the following named gentlemen, all of whom have them in use:

Boston: R. H. White, J. Montgomery Sears, J. T. Morse, Jr., Thos. Motley. South Boston: Benjamin Dean. Cambridge: F. A. Kennedy, John Bartlett, Chas. H. Gass. Portsmouth, N. H.: Hon. Frank Jones. Milton: Col. H. S. Russell, J. Malcolm Forbes. Dedham: A. W. Nickerson. Baltimore, Md.: J. D. Mallory. Newton: J. C. Potter, C. E. Billings, A. R. Mitchell. Waltham: J. H. Ellison. Readville: C. G. White. Beverly: Dr. Chas. Haddock. Swampscott; C. P. Curtis. Boston, Mass.: Waldo Adams, with the Adams Express Co. Philadelphia, Pa.: Edward N. Williams, of the Baldwin Locomotive Works.

The public are cautioned against all similar brackets, not marked with my stamp, as such brackets are infringements of patents held by me.

Also cedar-top riding-saddle bracket. Price $3.50 each. And whip-rack for English coach and straight whip combined. Price 50 cents each.

JAMES J. READ, 13 Tremont Row, Room 10.

DRAUGHTSMEN'S SENSITIVE PAPER
FOR COPYING DRAWINGS &C. IN WHITE LINES ON BLUE GROUND BY LIGHT AN EXCEEDINGLY CHEAP & SIMPLE METHOD
AMATEUR PHOTOGRAPHIC OUTFITS
SEND FOR PRICE LIST. THOS H McCOLLIN 635 ARCH ST. PHILADELPHIA PA.

PUBLICATION OFFICE OF THE
New England and the South.

ADVERTISERS *to reach the progressive people of the Southern States should use the*

"New England and the South,"

An Illust'd Monthly.

Each number containing from 50 to 100 engravings. It is also an excellent medium if you would reach the *Architects, Builders, Manufacturers, and Capitalists of the North.*

Hotel-keepers and nurserymen will find it to be of great value.

J. W. Manning of the Reading Nurseries says: "The best advertising medium in New England."

The Boston Daily Journal says: "An Illustrated Monthly of sufficient merit to cause it to be preserved."

GEO. H. CHAPIN, Publisher.

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Special Bargains in the Famous Piedmont Region of the South.

Caesar's Head Hotel (less than a day's buggy ride from Mr. Vanderbilt's Extensive Purchase at Asheville, N. C.) with park of 2233 acres. Price $35,000, $5,000 cash, balance in annual payments.

One Million Acres Timber Land in North and South Carolina from 75 cents to $1.00 an acre.

Vineyards, Plantations and large unimproved tracts of land for Colonies.

Southern Village, comprising Cotton Mill 100 x 60, 3 stories, capacity 5000 spindles; warehouses, store, cotton gin, flouring, grist and saw mills, president's and superintendent's residences, 35 houses, 3 stables, and 288 acres land, now doing profitable business. Price $25,000. $5,000 cash, balance in annual payments.

A Palatial Southern Home. In famous Nacoochee Valley, fine house and out-buildings upon which more than $75,0 0 has been expended, 2,500 acres, adjoining a gold mine with capitalization of $2,000,000, the same vein extends through this estate. Price $28,000, including blooded stock, machinery, etc. Apply to Capt. J. H. Nichols, Nacoochee, Ga. or to Geo. H Chapin.

"Grand View Hotel" with 3,000 acres at Tallulah Falls, the "Niagara of the South." valuable gold deposits, over a mile of water-power, one of the best localites for an industrial town in the South. Price $85,000, easy terms. Apply to W. D. Young, Tallulah Falls, Ga., or to Geo. H. Chapin.

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DINING-ROOM SETS,
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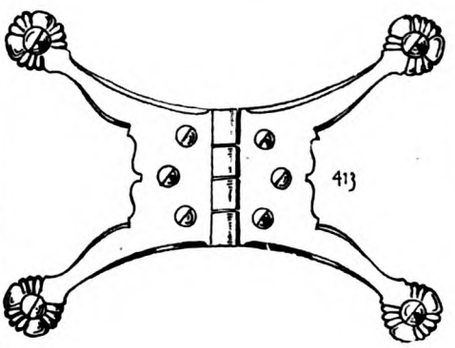
When you write, mention this paper.



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ESTABLISHED 1860.

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Every Excellence of Mechanism. Latest and most approved Styles and Finish.

Special New Designs of Knobs in Cut-Glass. Patterns made to order from Architect's Designs. Estimates made. Contracts filled in all Markets.

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Our Hardware may be found in important buildings in the leading cities of the Country.

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MANUFACTURERS OF

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THE AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 93. SATURDAY, MARCH 1, 1890. VOLUME XXVII. No. 740.

BRICK-MAKING MACHINERY.

THE recent large fires in some of our cities, which established the superiority of brick as a building material, and also the adoption of them as street-pavers, has given the brick business a new and unprecedented impetus.

New machines for the production of them are being constantly invented and put into the market, which generally marks a step forward in producing finer qualities and larger quantities of ware with a reduction of labor in the manufacture.

The Frey-Sheckler Company, of Bucyrus, Ohio, have just issued a catalogue illustrating a series of machines, mostly of the stiff-clay pattern, which is very interesting. It not only shows eight different styles of machines for the making of brick and tile, also hollow building-blocks, but gives description of full factory outfits which this firm manufactures, including power, preparatory machines, elevators, dump-cars, etc. A cut of one of these machines is shown herewith.

In order that our readers may keep pace with this branch of the ceramic art, a short description of this class of machinery will not be uninteresting.

The machine is called the Duplex Acme Brick and Tile Machine, in distinction from the single Acme Machine, as two machines are driven by one set of gearing.

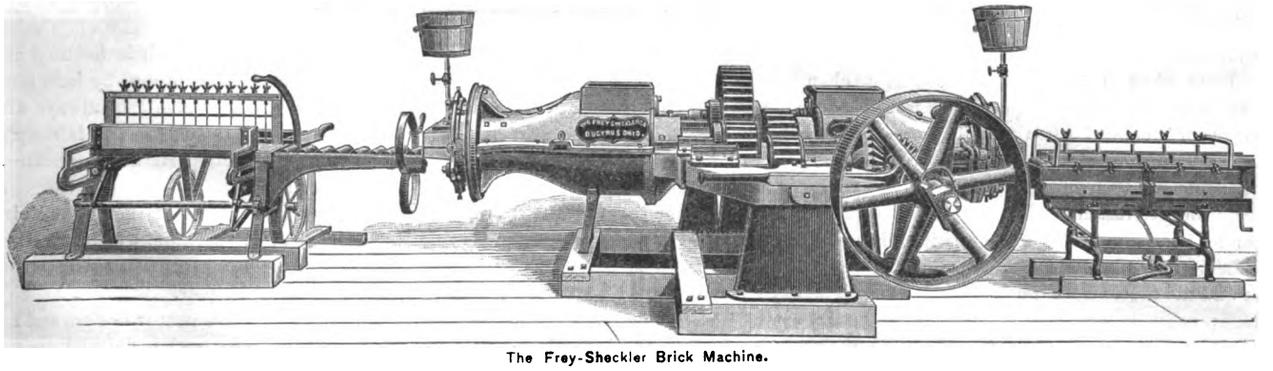
The large parts of the cylinder where the clay enters is provided with mixing-knives, while the smaller parts have propelling augers inside, which force the clay through a die of the proper form for brick tile or hollow blocks.

The dies are lined with over-lapping plates of sheet steel, from under which a lubricant of water, oil or steam exudes, reducing the friction and insuring sharp corners on the ware.

The Duplex system, besides increasing the output to double that of a single machine, balances the end pressure on the forcing shaft.

One end of the cut of machine shows the mechanism for cutting the slab of clay as it issues from the mouth-piece into side-cut brick. The same operatives cutting twelve brick also put them on pallets and shove them on the truck shown in the foreground, thereby doing away with most of the hard labor in handling the brick. Side-cut bricks are generally preferred for building brick, while paving bricks are made end-cut; this machine pushes out two streams of end-cuts, which are cut by different devices and carried off on a travelling belt.

THE FREY-SHECKLER CO.,
BUCYRUS, O.



The Frey-Sheckler Brick Machine.

THE OTIS BROTHERS AND M. EIFFEL.

OTIS BROTHERS, elevator-builders of New York, have brought suit before the Tribunal de Commerce de la Seine, in Paris, against Gustav Eiffel, designer of the celebrated Eiffel Tower, to recover a balance of $14,700 alleged to be still owing on the thirty-thousand-dollar contract under which they were to furnish and deliver on the grounds of the Paris Exposition two elevators, which were to be run from the ground up to the second platform of the tower. Otis Brothers aver that, under the contract, they were simply to deliver the elevators in working condition, and M. Eiffel was to put them up; but the defendant objected to this simple delivery and refused to pay the balance, on the ground that the elevators were not up and running when the exposition opened its doors to the public. Chief Engineer T. E. Brown, Jr., of the Otis Company, said recently that the material was delivered on the ground as the contract required, and all delay in putting up the elevators was due to M. Eiffel. There were five elevators in all on the Eiffel Tower, two made by Otis Brothers. They cost in all about $400,000, and cleared a net profit during the exposition of 6,000,000 *f.* — *New York Times.*

A PHOTOGRAPHIC NOVELTY.

RAPID as has been the progress in all branches of photography, the problem of seizing and reproducing the varied colors of nature seems as far from solution as ever. That achievement is still the dream of the ambitious photographer, and some day perhaps chemistry may help the experimenter with her subtle secrets to make the dream a reality. Apart from this supreme problem, however, photography is making daily extraordinary advances. The art to-day is unlike that of yesterday, and what it may be to-morrow no one can predict. The cumbersome methods of the past have been abolished; keener sensitive surfaces have been discovered; the dry glass plate has driven out of the field the old wet process, and other improvements are making still easier and more delightful the work of the photographic amateur.

The latest novelty — and a charming one it is — is the Kodak camera, brought out by the Eastman Dry Plate Company, of Rochester, N. Y. This consists of a small oblong box no longer than an ordinary cigar box. A roll of prepared paper stands behind the lens, which is covered by a revolving shutter. The box is presented to the object to be photographed; a little stud is pressed with the forefinger of the left hand; snap goes the shutter; the exposure has been made, and a turn of the handle on the top of the box brings a fresh portion of the roll behind the lens ready for the next picture. The roll is large enough for a hundred pictures, and a child can manipulate it.

The pictures thus taken are necessarily small, but they are perfect little gems. So sensitive is the prepared surface, that although the exposure is only the fraction of a second, the amount of detail in the picture and the clearness and sharpness with which it comes out is amazing. For broad landscape effects the Kodak is, of course, not intended. Its strongest point is in reproducing those choice bits of Nature which abound in every locality.

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A quaint, picturesque cottage with its vine-clad porch and clump of sugar maples; a quiet turn in the brook, with perhaps an old willow bending over it, or a group of silver birches brightening up the rising bank; a bold jutting piece of rock; the village church; the blacksmith's shop with horses waiting to be shod; the country school-house with its inmates just let loose — these are a few of the things which the Kodak turns into pictures of beauty and a joy forever.

For the tourist or the over-worked business man spending a few weeks' vacation in the country, the Kodak, when known, will be indispensable. It takes up little room and can be carried in a small satchel slung over the shoulder, and is always ready for use. — *New York Tribune, December* 12, 1888.

THE EASTMAN CO.,
ROCHESTER, N. Y.

ANAGLYPTA.

THE difference between "Anaglypta" and all other embossed paper fabrics is this — that whereas the other fabrics have been first made as an ordinary paper and then embossed as a separate process, anaglypta is embossed while the pulp from which it is made is in a plastic state and before it assumes the form of paper.

The advantages in favor of "Anaglypta" are many; the following are a few: —

1. The saving of one process in manufacturing.

2. The power of producing, if needed, much greater sharpness and delicacy in the modelling.

3. The power of making the fabric to a thickness that is quite unattainable by the old process.

4. The parts in relief are thicker, and therefore will maintain the relief when pasted for fixing, and after having dried on the walls, etc.

Anaglypta.

5. Even when made into a thin fabric, it does not lose its relief when pasted on walls; having been embossed when plastic, it never assumes a flat form; whereas, with paper previously made and then embossed, the tendency is very strong to resume its original flat form as soon as it begins to dry after pasting, the result being that all the spirit of the modelling is lost and the fabric is a failure.

The process is one that allows of the material being embossed into very bold relief.

7. Anaglypta is very much cheaper than any other fabric of a like character, and therefore admits of this very high-class form of decoration being available for a much greater amount of decorative work.

It is certain that to be appreciated by artists it is essential that the designs of such a fabric should be of a high class and well modelled, and this firm spares no pains or expense in obtaining the assistance of the most skilful designers, modellers, and engravers.

The style of patterns in anaglypta vary very much and include Queen Anne, Renaissance, French, Venetian, Indian, Persian, Moorish, Greek, Arabian, Japanese, Louis XVI, Adams, Pompeian, Old English, seventeenth-century German; and amongst the artists (whose names are given on our price list) may be found the following well-known names: Owen W. Davis, architect, C. F. A Voysey, architect, Dr. Christopher Dresser, Ph.D., F. L. S., etc., J. Lamb, A. W. Cooze, and T. Sheffield. Some of our best designs are by artist friends who prefer to remain *incog.*

The sole American agents are,

NEVIUS, & HAVILAND,
406 BROADWAY, NEW YORK.

A QUICK CHANGE OF LARGE ENGINES AT THE BALDWIN LOCOMOTIVE WORKS.

JUST what it means for an engine to be self-contained and shipped completely erected, tested and ready to put into operation is not always appreciated until practically illustrated. A recent occurrence at the Baldwin Locomotive Works proves this in a forcible way. The Hamilton Street Shop of that works has been operated for several years past (twenty-four hours a day) by a Westinghouse 200 H. P. Standard Engine, which is one of a dozen or more of the same kind in use in this extensive establishment. They have recently been replacing their larger Engines with Westinghouse Compounds for the purpose of gaining the greater economy due to the use of the latter. They recently had occasion to make a change from the 200 H. P. Standard Westinghouse to a 250 H. P. Westinghouse Compound, without stopping the works. The Standard Engine ran the shop up until 6 o'clock P. M., when it was stopped, disconnected, removed from the foundation; the 250 H. P. Compound was put in its place, connected up, pipes run, and was in operation at 3.30 A. M. This is probably as quick a change as was ever made with engines of such a size.

That this is only possible with a self-contained engine, which can be completely erected and tested in the shop in which it is built, is evident, and even with the advantages offered by such an engine for quick erection, it is a smart job of work to perform in such a limited time. It is somewhat doubtful whether or not it could be performed at all by any concern, unless it, like the Baldwin Locomotive Works, has been able to make a record for itself of turning out a locomotive complete in seven days after the receipt of the order.

WESTINGHOUSE MACHINE CO.
PITTSBURGH, PA.

ERICSSON'S HOT-AIR ENGINE.

JOHN ERICSSON, the noted inventor, on March 30, 1880, was granted a patent on a hot-air engine, which, later, he transferred to Mr. George H. Robinson, of this city, who, in turn, assigned all his rights under the patent to C. H. Delamater of the Delamater Iron Works, who secured a reissue of the patent, and proceeded to manufacture the peculiar engine. Mr. Delamater soon found that a number of other firms were engaged in the manufacture of Ericsson's hot-air engine, and he began proceedings to enjoin them. Among the manufacturers engaged in turning out the engines were John Weber, A. Flake, E. Bertine, M. Gibline, S. F. Knapp, C. R. Frisbie, H. Rheinhardt, Joseph Granger and W. H. Harrison. The injunction was asked against all of them, and they made answer that Ericsson was not the original inventor of the hot-air engine, and that it was in use prior to the issue of letters patent to him. Judge Lacombe granted the motion as to the priority of Ericsson's patents, but denied it as to the prior use of the engines.

DELAMATER IRON WORKS,
NEW YORK, N. Y.

WOOD'S PATENT PEDAL VALVE FOR RADIATORS.

THIS valve is the result of much study and of many costly experiments. Those who use steam or hot-water for warming from Direct Radiators, know from experience how much would be added to an otherwise satisfactory heating apparatus, if leaky, hard-working valves could be replaced by those working perfectly and requiring no effort beyond a simple touch of the foot to turn the heat on or off. The "Pedal Valve" fills the bill perfectly and can never be left partly opened. In low-pressure steam-heating this of itself is of the greatest importance. Many people attempt to regulate the amount of heat by the opening given the valve, under the mistaken idea that when a little heat is wanted, the valve should be opened but a little. This practice allows the radiator to fill with water, which soon finds its way through the air vent to the room, while the radiator and the whole heating apparatus enter a vigorous protest by loud thumping. The "Pedal Valve" is always either wide open or tightly closed. It is simple in construction and all parts are duplicate and interchangeable.

An important feature of the Pedal Valve is the absence of all packing, which in ordinary valves requires frequent renewal to prevent leaks on floor or carpets.

The Pedal Valve is neat in design, and made in the best manner, and is finished or unfinished, plated or plain, as may be desired. The price is but a trifle more than for the other standard makes of valves.

No more strained wrists, backs or tempers! A touch of the foot settles the question.

Economy. — In a large office-building, if it is easier to open a window than to turn off the steam, the window will "go up" when the room is too warm. If it is easier to turn off the steam than to open the window, the steam will be shut off when the room is too warm, and the one who pays for the coal will have less to pay.

The same economy will follow its use in dwellings, and comfort and convenience, with little effort and no worry, will be the result.

To the Trade. — In presenting the Pedal Valve we wish to call attention to the fact that the valves are all thoroughly tested before leaving the works and are so made by duplicating tools that any part can be replaced at any time. All unions are made as near the

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ball-joint as practicable, and are so accurately fitted that in testing the valves, the unions are only screwed together by hand and are tight. It will be noticed that the list is the same as the regular list of compressible-disc valves and while the discount is not quite as low as the others we believe the slight difference in price is more than covered by the quality of the work offered. The valve has a full opening and the valve-disc takes such a position as to leave an "elbow" opening when the heat is turned on.

THE Whittier Machine Company have recently put into the Suffolk County Court House, Pemberton Square, this city, two steel boilers each four and a half feet in diameter, together with twelve hot-water boilers each four feet in diameter.

TO MY SWEETHEART'S KODAK.

O Kodak, are you void of sense,
That you so stoically take
The pressure of her bright fingers fair,
Which all my nerves would wildly shake?

Ah! don't you see her wealth of hair;
Her eyes, so softly, brightly blue,
Now bent with tender interest,
O Kodak Camera, on you?

And can't you feel the lively thrill
Of pleasure in her lovely face
When you work well? O, Camera,
I'd like just once to have your place

Such pictures as I'd take for her!
Such glorious views of East and West!
Like magic they should come. Her smile
Would pay me well to do my best.

You don't appreciate your luck,
O Camera, with glassy eye,
Which, staring ever straight ahead,
Sees not the charming maid close by.

If I were you — but never mind,
You're not her lover, that is clear;
While I — I love the very ground
That only serves to bring her near.

But still I scarcely envy you,
Although from me you steal her smiles;
You're deaf, and dumb, and blind to all
Her beauty rare, her winning wiles.

And saddest; worst of all your lot —
Ah! this I could not bear and live! —
To feel that I belonged to her,
And then to take a negative!

M. A. B. EVANS.

HOW TO SECURE A GOOD TIN ROOF.

WE submit details for guidance in specifying for either Flat Seam or Standing Seam Tin Roofs, using either 14″ x 20″ or 28″ x 20″ size sheets. The Standing Seam is used where there is sufficient slope to carry off the rain-water, etc.; the Flat Seam where there is little or no slope.

FLAT SEAM TIN ROOF:

Using 28″ x 20″ *Size Sheets.*— Roof to be covered with "Merchant's Roofing" brand of roofing tin; each sheet to be stamped with brand and thickness. Sheets to be of IC thickness, 28″ x 20″ size; flat seam. When edged the sheets are to show 19″ x 27″ exposed on the roof. The seams to be well soldered with guaranteed half and half solder — rosin being used as a flux. The soldering irons should not weigh less than eight pounds to the pair, using not less than six pounds of solder to every one hundred (100) square feet exposed on the roof. Roof flashed up at sides, and counter flashed with same brand and thickness.

For gutters the same brand of roofing plate as above is to be used in IX thickness. Have the tin carefully put together, and the seams well soldered.

The tin to be underlaid with best quality red rosin sized sheathing paper, laid to lap at least two inches. Barbed wire nails, No. 12 x 1 inch to be used every five inches in nailing the tin to the boards.

The tin to be painted with Prince's Metallic Paint, mixed with pure Linseed Oil (one-half boiled and one-half raw) on the under surface before laying. Immediately after roof is laid, carefully clean off the rosin at seams; remove all dirt, etc., and then apply two coats of the above paint.

Using 14″ x 20″ *Size Sheets.*— Roof to be covered with "Merchant's Roofing" brand of roofing tin; each sheet to be stamped with brand and thickness. Sheets to be of IC thickness, 14″ x 20″ size; flat seam. When edged the sheets are to show 13″ x 19″ exposed on the roof. The seams to be well-soldered with guaranteed half and half solder — rosin being used as a flux. The soldering irons should not weigh less than eight pounds to the pair, using not less than eight pounds of solder to every one hundred (100) square feet exposed on the roof. Roof flashed up at sides, and counter flashed with same brand and thickness.

For gutters the same brand of roofing plate as above is to be used in IX thickness. Have the tin carefully put together, and the seams well-soldered.

The tin to be underlaid with best quality red rosin sized sheathing paper, laid to lap at least two inches. Barbed wire nails, No. 12 x 1 inch to be used every five inches in nailing the tin to the boards.

The tin to be painted with Prince's Metallic Paint, mixed with pure Linseed Oil (one-half boiled and one-half raw) on the under surface before laying. Immediately after roof is laid, carefully clean off the rosin at seams; remove all dirt, etc., and then apply two coats of the above paint.

STANDING SEAM TIN ROOF:

Using 28″ x 20″ *Size Sheets.*— Roof to be covered with "Merchant's Roofing" brand of roofing tin; each sheet to be stamped with the brand and thickness. Sheets to be of IC thickness, 28″ x 20″ size; standing seam. When edged the sheets are to show 17 1-4″ x 27 1-4″ exposed on the roof. The seams to be well soldered with guaranteed half and half solder — rosin being used as a flux. The soldering irons should not weigh less than eight pounds to the pair, using not less than 1 1-2 pounds of solder to every one hundred (100) square feet exposed on the roof. Roof flashed up at sides, and counter flashed with same brand and thickness.

For gutters the same brand of roofing plate as above is to be used in IX thickness. Have the tin carefully put together, and the seams well soldered.

The tin to be underlaid with best quality red rosin sized sheathing paper, laid to lap at least two inches. The tin to be well cleated, and each cleat to be nailed to the boards, at intervals of not over fourteen inches apart with two barbed wire nails, No. 12 x 1 inch.

The tin to be painted with Prince's Metallic Paint, mixed with pure Linseed Oil (one-half boiled and one-half raw) on the under surface before laying. Immediately after roof is laid, carefully clean off the rosin at the seams; remove all dirt, etc., and then apply two coats of the above paint.

Using 14″ x 20″ *Size Sheets.* — Roof to be covered with "Merchants Roofing" brand of roofing tin; each sheet to be stamped with the brand and thickness. Sheets to be of IC thickness, 14″ x 20″ size; standing seam. When edged the sheets are to show 11 1-4″ x 19 1-4″ exposed on the roof. The seams to be well soldered with guaranteed half and half solder — rosin being used as a flux. The soldering irons should not weigh less than eight pounds to the pair, using not less than two pounds of solder to every one hundred [100] square feet exposed on the roof. Roof flashed up at sides and counter flashed with same brand and thickness.

For gutters the same brand of roofing plate as above is to be used in IX thickness. Have the tin carefully put together, and the seams well soldered.

The tin to be underlaid with best quality red rosin sized sheathing paper, laid to lap at least two inches. The tin to be well cleated, and each cleat to be nailed to the boards, at intervals of not over fourteen inches apart with two barbed wire nails, No. 12 x 1 inch.

The tin to be painted with Prince's Metallic Paint, mixed with pure Linseed Oil [one-half boiled and one-half raw] on the under surface before laying. Immediately after roof is laid, carefully clean off the rosin at the seams; remove all dirt, etc., and then apply two coats of the above paint.

WINDOW SASH CORD.

THE Samson Cordage Works of Boston have been sending to architects, sample cards showing their solid braided cords for hanging sash-weights. These are made of linen, Italian hemp or cotton as desired — the cotton yarn being made in the same factory, and thus insuring good stock and a uniform strength of cord. The cotton makes the best wearing cord, and its durability is still further increased by the waterproof finish which this company applies when desired. The samples show all these varieties and are enclosed with an explanatory circular, the whole making a very neat appearance. The manufacturers propose to maintain the good name which the "Samson" Sash Cord has obtained for itself, and allow nothing but the best to go out under this label.

SAMSON CORDAGE WORKS.
164 HIGH STREET, BOSTON, MASS.

NOTES.

THE Whittier Machine Company have recently constructed for Mr. R. B. Brigham, this city, an elevator for passenger service upon the pressure-tank system.

NEW YORK, N. Y., February 21, 1890.

AMERICAN ARCHITECT, Boston, Mass.

Gentlemen:— Below please find copy of letter recently received from Mr. Harry Miner. Kindly publish copy of same in next edition of your paper, and oblige,

Respectfully yours,
I. P. FRINK.

PEOPLES' THEATRE, N. Y., February 14, 1890.

MR. I. P. FRINK, 551 Pearl Street,
New York City.

Dear Sir:— I could give you no more satisfactory evidence that the massive reflecting chandelier, with its 150 gas burners, lighted by electricity, and 126 incandescent electric lamps, you put in my Newark Theatre two years ago, has given entire satisfaction, than by ordering another exactly like it for the Fifth Avenue Theatre, New York City. I expect to make this one of the handsomest theatres in the City, and, as I considered your fixture one of the chief attractions in my Newark Theatre, I desire it also to be the same in this.

Yours is the only proper method of lighting a theatre and sooner or later will be adopted by all.

You may take your time in making it, as I do not take possession of the Theatre until May 1, 1890. Respectfully yours,

HARRY MINER.

AMONG recent notable orders for the famous "Gorton" house-heating boilers, recently received by the manufacturers, Messrs. Gorton & Lidgerwood Company, of Chicago, New York and Boston, is one No. 5 boiler, for heating the new City-Hall Building, at Brewer, Me., and one No. 3 boiler for heating the Fifth Judicial Court Building, 154 Clinton Street, New York City.

MR. W. W. HUNT, of Amherst, Mass., has been awarded the contract for heating the new City-Hall Building in that city, and will use for the purpose, two No. 5 "Gorton" house-heating boilers.

THE Chrome Steel Works of Brooklyn, N. Y., have for some time past been experimenting for the purpose of producing stamp mill shoes and dies which should prove superior to any heretofore made. The result achieved has been even beyond their expectations. They have obtained a formula whereby they are now making shoes and dies guaranteed to wear evenly from beginning to end of service and which will last longer than those of any other make heretofore employed. Further information will be cheerfully furnished upon application to the manufacturers. The addition to the Chrome Steel Works, already mentioned in these columns, is rapidly nearing completion.

THE firm of C. B. Demarest & Co. expired by limitation January 1, 1890, and a new firm has been formed of the same partners with the addition of Mr. Henry D. Warner, continuing under the same firm name. C. B. Demarest, M. H. Leonard, M. C. Reid, H. D. Warner.

THE Whittier Machine Company have recently constructed for the Revere Rubber Company for their works in Chelsea, Mass., four horizontal steel boilers, each six feet in diameter.

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Something New for the Stable.

Read's Patent Harness Bracket.

An Article long wanted but never before made.

Holds the whole harness, takes no more room than the ordinary hook or peg, can be used for both single and double harness. Gives the harness-case a neat appearance, as it carries the harness up uniformly in width with the saddle, beside keeping the bridle and breastplate in their proper shape. They are neatly japanned, with gilt facings. Price **$18** per dozen. Are now in use in over 100 first-class private stables in and about Boston.

Each bracket lettered **"J. J. Read, Boston, Mass."** For sale by dealers everywhere.

Indorsed and approved by the following named gentlemen, all of whom have them in use:

Boston: R. H. White, J. Montgomery Sears, J. T. Morse, Jr., Thos. Motley. South Boston: Benjamin Dean. Cambridge: F. A. Kennedy, John Bartlett, Chas. H. Gass. Portsmouth, N. H.: Hon. Frank Jones. Milton: Col. H. S. Russell, J. Malcolm Forbes. Dedham: A. W. Nickerson. Baltimore, Md: J. D. Mallory. Newton: J. C. Potter, C. E. Billings, A. R. Mitchell. Waltham: J. H. Ellison. Readville: C. G. White. Beverly: Dr. Chas. Haddock. Swampscott; C. P. Curtis. Boston, Mass.: Waldo Adams, with the Adams Express Co. Philadelphia, Pa.: Edward N. Williams, of the Baldwin Locomotive Works.

The public are cautioned against all similar brackets, not marked with my stamp, as such brackets are infringements of patents held by me.

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An Illust'd Monthly.

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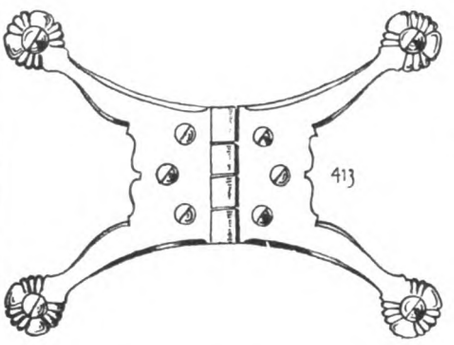

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 94. SATURDAY, APRIL 5, 1890. Volume XXVIII. No. 745.

ILLUSTRATIONS.

ART TILE MANTEL-PIECES. MADE BY LOW ART TILE CO., CHELSEA, MASS.

WROUGHT IRONWORK. MADE BY MR. JOHN WILLIAMS, 544 WEST 27th STREET, NEW YORK, N. Y.

BOWLING-ALLEY. PATENTED BY MESSRS. REISKY & WOLFF, ROCHESTER, N. Y.

PENNSYLVANIA GREEN STONE.

Of all stones quarried in this country for exterior construction the most unique and beautiful is the Pennsylvania or Serpentine. It is remarkable for its color, durability and cheapness.

The color is a greyish green, rich, glowing and constant, and is produced by a small percentage of oxide of chromium, irregularly distributed through the stone. No other rock, except the best granite, holds its color so well, neither staining nor fading: it sheds dirt and dust like enamel.

Its durability has been tested from remotest periods. In the British Museum may now be seen Assyrian carvings of the Serpentine. Two houses, still standing in good condition, showing no corrosion or decay, were built of stone from our quarry in 1730, and several others in the neighborhood, excellently preserved, are more than a hundred years old. It withstands the hottest fires. When the Beth-Eden Baptist Church of this city, burned down, the granite columns and the sandstone trimmings were destroyed, but our green-stone ashlar was uninjured, and was again used in the reconstruction of the building.

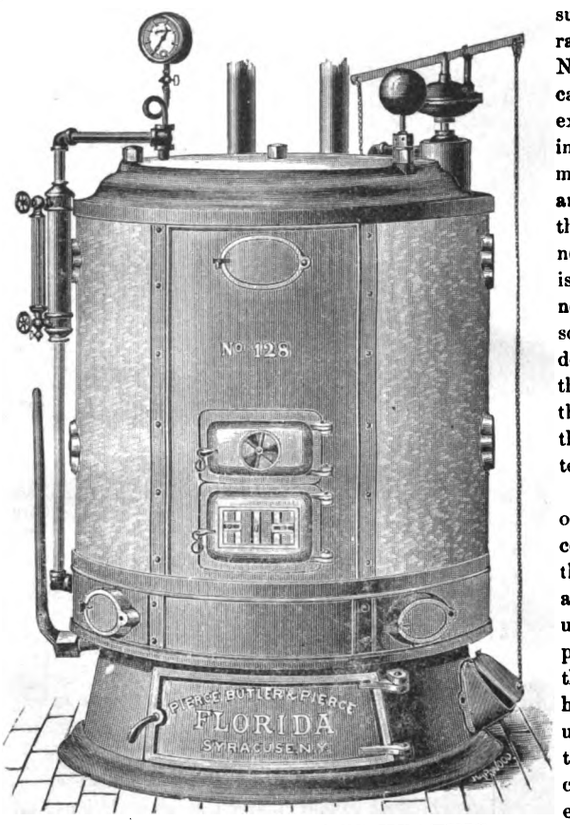
It is a cheap stone to cut. Like soapstone in composition and softer than most limestones, it can be sawed and wrought like wood. It is the mechanic's delight, being ready and facile, and yielding to his entreaties without violence and with but little labor.

Scientists tell us that "geologically, the stone is allied to the igneous rocks, in many cases appearing to have resulted from the alterations of sedimentary stratas by heat. In mineralogy it is classed among the hydrosilicates of magnesia, being an exactly equal compound of silica 43.6, and magnesia 43.4, and about 13. of water." They also represent it as one of "the few fireproof rocks, being itself of igneous origin, having, no doubt, in many cases, been ejected from vast depths through fissures of the earth's surface. It does not crack or fuse under the highest artificial heat."

The quarry is admirably situated for transportation purposes, being within easy and equal hauling distance of both the Pennsylvania and Baltimore & Ohio railroad systems, enabling us to secure the lowest through rates of freight on all shipments.

Stone shipped in the rough, or cut ready to set, as may be desired. Samples, prices and estimates furnished upon application.

GARRETT & DIX,
3201 Walnut Street, Philadelphia, Pa.



STEAM AND HOT-WATER HEATING-APPARATUS.

The Pierce, Butler & Pierce Manufacturing Company, makers of the well-known "Florida," undoubtedly cover the ground in the line of heating-apparatus more completely than any other concern in the world. They manufacture three distinct constructions: a heater, self-feeding for hard coal; a heater, self-feeding for hot water, and also one for soft coal, each perfect and efficient for the use to which it is adapted.

This company not only make these three different single heaters, but they also manufacture a double-heater in each of the above constructions by placing two boilers in one jacket, the draughts and valves being so arranged that either one or both heaters may be used according to the season. This is the first attempt at a construction of this kind that has ever been made by any concern; and the great demand for the double "Florida," since it has been placed upon the market, demonstrates the satisfaction it has given.

The latest device, which has been added to their list, is what is known as the Florida "Heavy Duty" steam-heater, made specially for large buildings. It is similar in principle to the double-heater, but much larger, and will supply as much as 4200 square feet of radiation. It is made in three sizes, No. 73, 75 and 77. It is constructed of cast-iron, similar to the regular Florida, except that the sections are divided into three parts. This heater has a magazine feed and all the most modern and improved attachments, and all the large valves, tees and other connections are included in its price. It is positively non-explosive; requires no brickwork and is equally as handsome in appearance as the present double Florida. The great demand for the "Heavy Duty" from all parts of the country is the clearest evidence that it is replacing to a great extent wrought-iron tubular boilers.

The above is an exterior illustration of the "Florida" steam-heater for hard coal, which has become so well-known to the public, and is at the present time, after being used for many years, looked upon as reliable and desirable in every particular, thoroughly well-made and of the best materials for such uses. No heater ever put upon the market has upon its honest merits made a reputation that manufacturers all over the country have looked upon with so much envy as the "Florida."

The "Florida" is undoubtedly handled by the finest and largest of the trade throughout the country and is being specified by the leading architects, which is a clear indication of the heater's popularity and efficiency.

The "Florida" hot-water heater is constructed upon the most advanced and scientific principles of water circulation, proven practical and economical in actual use on all classes of hot-water work. Its principle has long been recognized by eminent engineers and experts, who study and investigate such matters, as the best and simplest for heating

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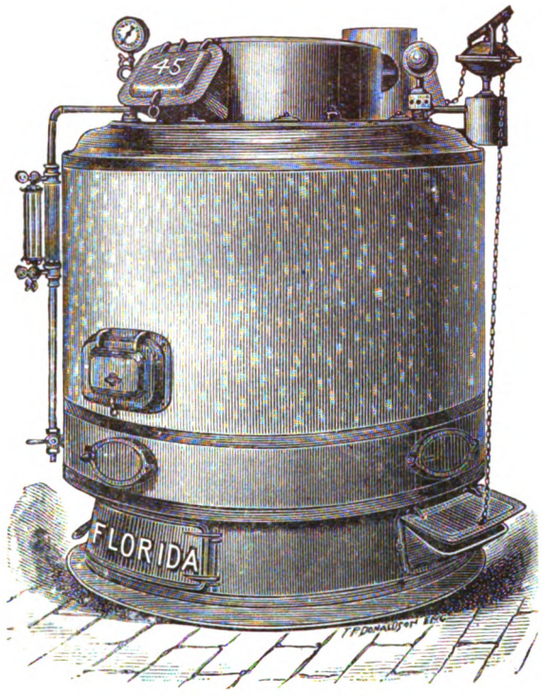
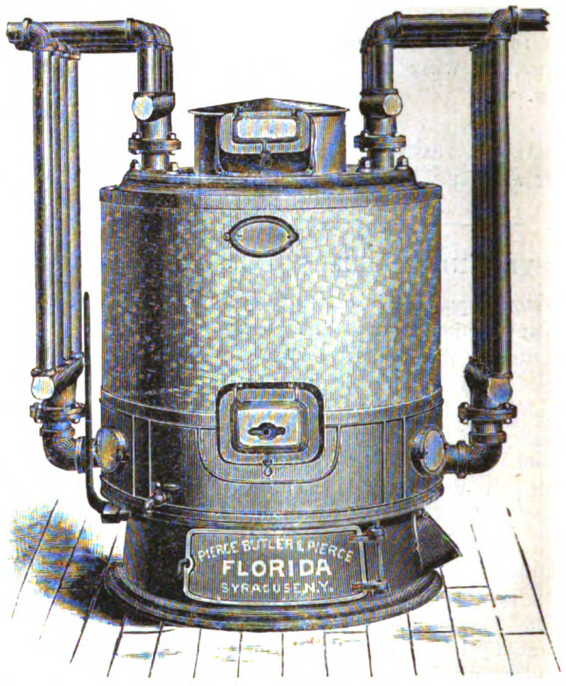
purposes, and under every condition the most reliable and quickest circulations are obtained. With this principle the very best results from fuel consumed are realized in use. The "Florida" hot-water heater has a magazine feed, which enables it to run for twenty-four hours or longer without requiring to be supplied with fuel. It contains the full amount of heating-surface claimed for it, and has well earned a high reputation. To all its parts there is an easy access; none of its heating-surfaces are exposed to the atmosphere, but are enclosed in a heavy galvanized-iron jacket lined with pure asbestos. Those who have used the "Florida" hot-water heater can testify to its general efficiency and economy.

The "Florida" heater for soft coal, which has been upon the market for the last three years, was made chiefly to supply the great demand from the inhabitants of those regions where soft coal is a natural product and can be obtained at such a low price. It is somewhat similar in principle to the regular





"Florida" steam heater, but so constructed that the most perfect combustion of soft coal has been secured without many of the annoyances heretofore experienced in its use. It has no flues and the construction of the combustion-chamber is such that the smoke and gases are all consumed. This heater is very economical in fuel; because the water is confined in narrow spaces, the heat acts upon both sides of each space, and the water circulates horizontally over the fire-surfaces in each section independently, being held in close contact with the fire until it escapes upward in the form of steam.

The Pierce, Butler & Pierce Manufacturing Company fully guarantee every heater turned out of their factory, and the workmanship and materials placed in the "Florida" are the very best that can be obtained. Great care is taken in the fitting up and general construction of the heaters, and the manufacturers take special pains to please their customers in every particular.

PIERCE, BUTLER & PIERCE MFG. CO.,
SYRACUSE, N. Y.

The Whittier Machine Company have recently put into the Water-works at Hyde Park, Mass., one horizontal steel boiler five feet in diameter.

STEAM ENGINE FOUNDATIONS EMBEDDED IN AIR.

Among the remarkable examples of bold engineering in the great sugar-refinery of Claus Spreckels, at Philadelphia, Pa., one of the most unique is the hanging or aerial steam-engine foundations. The engines used in this establishment are distributed practically all over the building, a large proportion of them being on upper floors. Some of these engines are bolted to iron beams or girders on second and third stories of the building, and are consequently innocent of all foundation. Some of these engines ran noiselessly and satisfactorily, while others produced more or less vibration and rattle. To correct the latter, the engineers simply suspended foundations from the bottoms of the engines, so that, in looking at them from the lower floors, they were literally hanging in the air. A foundation does service to an engine, or any machinery, it seems, by its weight alone; hence, it makes little difference whether the foundation be firmly embedded in mother earth or in the air.

WESTINGHOUSE MACHINE CO.,
PITTSBURGH, PA.

WESTINGHOUSE, CHURCH, KERR & CO. OPEN A HOUSE IN ST. LOUIS.

Five years ago Westinghouse, Church, Kerr & Co. established themselves as Engineers in New York, occupying a small office on the fifth floor. Their business at that time was confined almost wholly to the handling of the Westinghouse Standard Engine. They were immediately successful from the first, and were soon obliged to find enlarged accommodations at 17 Cortlandt Street. This office occupies the entire first floor of the building, and is handsomely fitted up as the headquarters of the Company.

The development of the Westinghouse Junior and Compound Engines has greatly increased their business, and from time to time other engineering specialties have been approved and purchased by them, forming a large item in their business. They confine themselves wholly to the generation and distribution of steam-power, in which department their experience has perhaps been as extended as that of any other concern in the country.

The continuous growth of their business has required the successive establishing of Branch Offices, first in Pittsburgh and Philadelphia, and later in Boston and Chicago. The office at Chicago is conducted independently of the New York office, and has been equally successfull. St. Louis has always been an objective point, about which most of the Western trade develops, and on the first of January, 1890, Westinghouse, Church, Kerr & Co. opened their fifth branch office at 511 North Fourth Street, St. Louis, from which office the Southwestern business will hereafter be handled. The Chicago and St. Louis offices are now controlling all the trade throughout the West and Southwest to the Rocky Mountains.

The development of a business of this magnitude on conservative principles and by steady growth is a good evidence of what can still be done on the lines of old-fashioned business ideas judiciously mingled with enterprise and responsibility.

WESTINGHOUSE MACHINE CO.,
PITTSBURGH, PA.

NEW CATALOGUE AND PRICE-LIST

The Buffalo Door and Sash Company of 9th Avenue and 124th Street, New York City, have issued a complete and copiously illustrated catalogue (price-list attached) of the goods which this enterprising and progressive concern produces.

The catalogue is so comprehensive and complete that every architect and builder will find it a valuable addition to his professional library. This price-list includes within its covers illustrations of absolutely all styles of doors, sash and outside trim now known to the trade, besides a very large number of entirely novel and original designs conceived in the best taste and executed in the most workmanlike manner.

The company have taken great pains and gone to considerable expense to make their catalogue and price-list worthy of themselves and the work it depicts, therefore they confidently present it to the trade as a complete compendium of designs in doors, sashes, blinds, mouldings and all forms of inside trimmings.

The work deserves a more extended notice than it is here possible to give, but as the company will mail the catalogue without charge to any one who will address them a request for the same, enclosing six cents in stamps for postage, we think it unnecessary to do more than advise our friends to send for one of "The Buffalo Door and Sash Company's New Illustrated Catalogue and Price List."

BUFFALO DOOR AND SASH COMPANY,
NEW YORK, N. Y.

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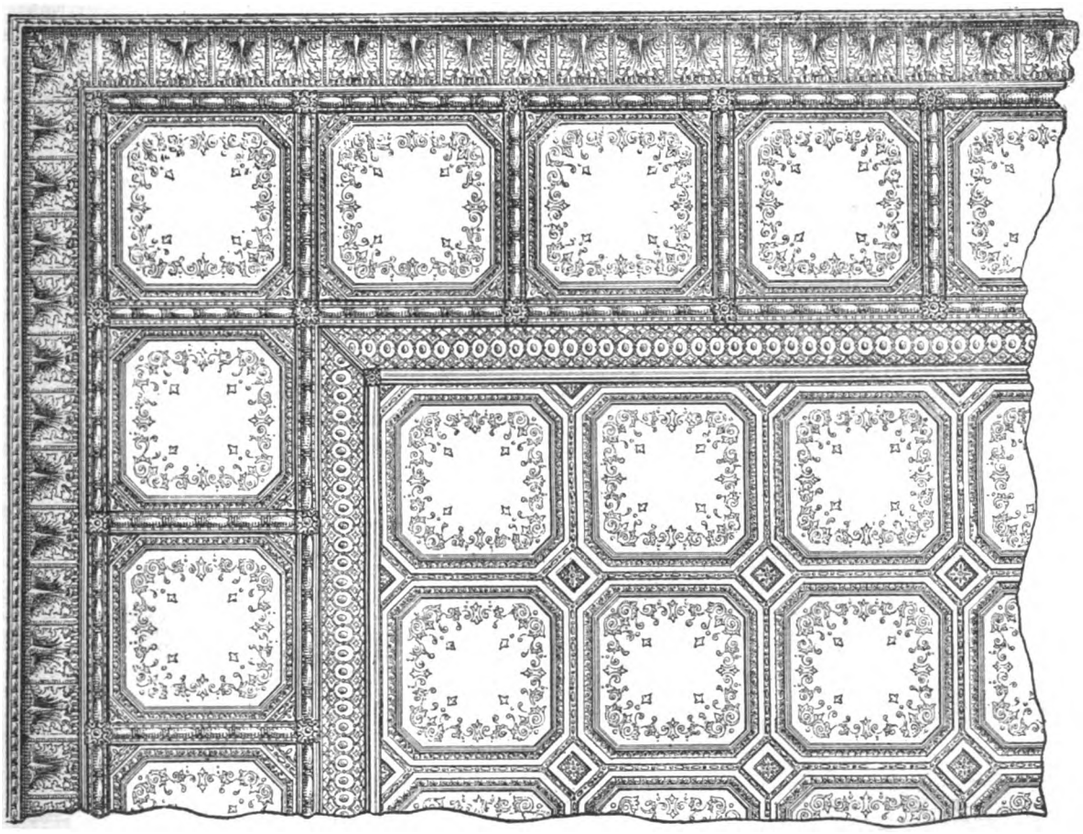
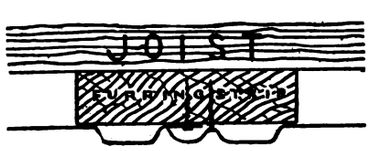
NEW CEILING DESIGNS.

THE many improvements in metal ceilings have changed their character wonderfully, of late. It is only a few years ago, that the only varieties offered the architect were those of corrugated-iron, arranged in various ways, but always open to much criticism. The impossibility of making such a ceiling that would not show waves and other irregularities, led Mr. H. S. Northrop, after much experience, to stamp sheets for this purpose in decorative patterns, and —as they proved popular—to equip himself with the largest presses for this kind of work.



The illustrations show two of his latest designs. The first represents a ceiling formed of sunken panels of No. 29, sheet-steel, covering 27″ x 27″. The moulding or style is pressed on the same sheet and the joint is along the line of beadwork, in the recess of the moulding, so that it is invisible. Small wire nails are used to fasten it, driving them between the beads. The border panels have a separate moulding between them. The cove is of an embossed leaf pattern. The mat may be as wide as found necessary. Several other of his patterns are suitable to use with this sunken panel, as a border or otherwise. One of them, a new one, is shown in the next illustration, made by the photo. process, so that it is a perfect representation. This plate is 24″ x 24″. The joint is invisible. A ceiling can be made of it entirely, showing one continuous pattern, or it may be diversified with other patterns and mouldings of various sizes.



Mr. Northrop now makes several enriched mouldings, which may be lapped together without showing joints. These are a great improvement over plain ones, where it was necessary to cover the joint with a rosette, not always desired. Mr. Northrop is now ceiling two public schools, one of 40,000 square feet in New York and one of 19,000 square feet in Brooklyn, besides many smaller buildings and shipping orders. This ceiling is more simple in application than any heretofore used, so that carpenters and other mechanics, not trained, can do very good work.

When properly put up and painted, it is airtight, a very desirable feature, necessary with some systems of ventilation.

Besides his own designs, Mr. Northrop can quickly make dies, from the special drawings of any architect where the size of the order warrants it.

HENRY S. NORTHROP,
18 ROSE STREET, NEW YORK, N. Y.

LOW ART TILES.

THE accompanying illustrations of Art Tile Mantels made by the Low Art Tile Company, of Chelsea, Mass., show the advent of a new era in tile-making. Heretofore all dust tiles have been made on flat planes, and, therefore, no architectural lines could be obtained; only flat surfaces could be covered. At present the Low Company are making tiles and tile-mouldings following almost any desired line, with plain surfaces or with Classical decorations. This opens the widest possible field for the use of tiles for wall decorations. There is nothing new in the idea of facing the walls of a room with tiles. It has been done for centuries by the Persians and the Moors, the Chinese, the Japanese, the Swedes, Russians, Dutch, and in fact by almost every nation in Europe and Asia, but the novelty and the value in the case of the Low tiles lies in their architectural possibilities. Glazed pottery is the most indestructable (by natural processes) material known. It is, of course, absolutely fireproof, and nothing could be more cleanly. Vermin can find no lodgement in walls and ceilings of tile, neither can the germs of disease. From a hygienic point it is perfect. These are some of the utilitarian advantages. From an artistic standpoint what could be more beautiful than a room treated in the delightful colors of the Low tiles, with base and cap mouldings for the wainscots, panelled walls, cornice, architrave, spring arches and free columns all treated as simply or as elaborate decorations as should be desired? What an exquisite relief from

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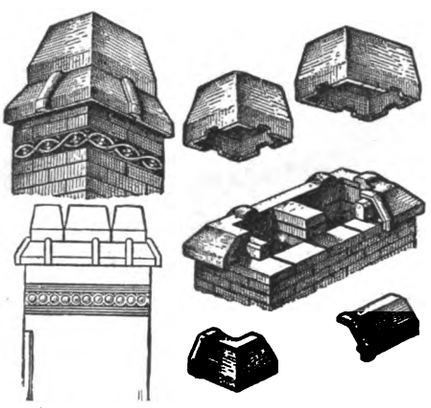
the ghastly marble so frequently seen in hotels and public buildings, and at infinitely less cost than the same lines and reliefs could be obtained in the latter material and with incomparably more effective color. The illustrations of these mantels only suggest the possibilities alluded to above, yet in themselves they will appeal to all architects, decorators and house builders through their correctness of design, beauty and variety of color, novelty, moderate cost and the many advantages they possess over mantels made of wood or other material.

THE LOW ART TILE CO.,
Boston Office, 50 Boylston St.

TERRA-COTTA CHIMNEY TOPPING.

Improvements will never cease so long as the needs and the genius of humanity exists. Every day something or other is projected to fill a long felt want. The Hansen Salt Glazed Terra-cotta Weather-protecting Chimney Topping, for the proper protection of chimney masonry from the usual early destruction by action of rain and frost, presents the cheapest, most practical, ever ready and lasting material for bricklayer's use in topping out chimneys.



Saves annoyance, repairs and expenses, the usual and too frequent experience of owners. Indorsed by architects throughout the country. Architect J. W. Root, secretary of the American Institute, writes: "Your circular advertising the patent chimney tops was forwarded to me by the ex-secretary of the Institute; I think well of them." D. W. Millard, St. Paul, Minn.; John Gash, San Francisco, Cal.; E. A. Bowd, Lansing, Mich.; T. D. Evans, Pittsburgh, Penn.; Warren H. Hayes, Minneapolis, Minn.; L. J. Swett, St. Albans, Vt.; Chas. D. Marvin, New York, N. Y.; Bullard & Bullard, Springfield, Ill.; Stoltze & Schick, La Crosse, Wis.; E. S. Radcliff, Duluth, Minn.; W. Leon Clark, Washington, D. C., and many others, write of it as admirably adapted for such usages and designed to replace the common brick-corbeled chimney-top, and will last as long as the building stands.

GLOBE VENTILATORS.

It having come to our notice, that certain parties calling themselves the World Ventilator Co., are offering for sale ventilators similar to the globe in construction, and which we are advised infringe our letters patent.

Makers, venders and users of ventilators are hereby notified that the globe ventilators are made under the following named patents, to wit:

U. S. Letter Patent	No. 174,304,	dated	February 29, 1876.
" " "	" 177,280,	"	May 9, 1876.
" " "	" 383,592,	"	May 29, 1888.
Canadian "	" 7,517,	"	June 5, 1877.

That their validity has been examined and approved, and that all persons unlawfully making, selling or using ventilators which infringe any of the above named letters patent, will be held to strict accountability, and all infringers will be promptly prosecuted.

GLOBE VENTILATOR CO.,
203 River Street, Troy, N. Y.

NOTES.

The Radiator Pedal Valve described in our issue for March 1, is manufactured by the Utica Steam Gauge Company of Utica, N. Y.

We desire to make it known that during the past year, we have removed our works to Newtown Creek, Paidge Avenue, Setauket and Brant Streets, in the Seventeenth Ward in the city of Brooklyn [known as Greenpoint], where we have built new shops especially arranged and adapted to our business, and fitted them up with the best and most approved tools and machinery for the rapid and economical manufacture of all kinds of architectural, ornamental, and other kinds of ironwork for building purposes.

With these unequalled facilities and our long experience, we can guarantee to our friends and customers, both old and new, the best of work on short notice at reasonable rates.

Correspondence solicited and approximate estimates cheerfully given on contemplated work if desired.

We are also prepared to do repairing in all its branches.

CHENEY & HEWLETT,
207 Broadway, New York, N. Y.

The arrangement of the electric-lights that the Executive Committee of the Metropolitan Museum of Art, New York, has determined to place throughout the entire building has caused the committee-men a great deal of bother and worry. There were different opinions as to the best arrangement of lights for the galleries of paintings. The question was settled by having the electricians arrange lights according to different methods in different rooms for inspection. At the meeting of the full Committee I. P. Frink's system of reflectors was unanimously adopted. With these reflectors the paintings will be evenly covered with a light without glare and throwing the interior of the room into the shade. Now that this is settled upon, the work of lighting every gallery in the Museum is being rapidly pushed by Mr. Frink, and very soon the Museum will be thrown open on Tuesday and Friday nights.

The Whittier Machine Company have recently put into the store of Messrs. Beal, Higgins & Henderson, corner of Washington Street and Temple Place, this city, an hydraulic elevator for passenger service upon the hydro-electric system.

BUILDING INTELLIGENCE.

Reported for the American Architect and Building News.

ALTERATIONS.

Denver, Col.—*Stout St.*, cor. Seventeenth St., addition and alteration to terrace; cost, $30,000; owners, Bennett & Meyers; architects, F. E. Edbrooke & Co.

Curtis St., near Twenty-sixth St., brick addition to dwell.; cost, $4,000; owner, H. Seradsky; architect, Wm. Quayle.

Detroit, Mich.—Vinton & Co., interior alterations and new front to 264 Woodward Ave.; cost, $5,000.

APARTMENT-HOUSES.

Brooklyn, N. Y.—*Fifty-sixth St.*, s s, 100′ w Third Ave., 5 two-st'y basement and attic, tin roofs; cost, each, $2,500; owner, Richard K. Fox, 2038 Fifth Ave., New York; architects, H. L. Spicer & Sons, Third Ave. and Fifty-third St.

Chicago, Ill.—Mrs. Henaburg, two-st'y flats, 254 Loomis St.; cost, $4,000.

C. Levin, two-st'y flats, Wright St., near Fifty-seventh St.; cost, $2,500.

W. F. Meek, 3 two-st'y flats, 5560 Tracy Ave.; cost, $3,800.

John Paczynski, two-st'y flats, 9002 Exchange Ave.; cost, $2,300.

R. Brower, 2 two-st'y flats, Sixty-fifth Ct., near Stewart Ave.; cost, $5,000.

Robert Laner, 2 three-st'y flats, 533 and 535 Larrabee St.; cost, $13,000.

Theo. Stricker, two-st'y flats, 1571 Otto St.; cost, $2,200.

John Kalwiskowski, two-st'y flats, 5127 Bishop St.; cost, $2,000.

Chris. Anderson, three-st'y flats, 3115 Shields Ave.; cost, $5,000.

Albert Wisner, 4 four-st'y flats, 2722-2730 Ingleham Pl.; cost, $10,000.

Albert Wisner, 4 four-st'y flats, 2725 Cottage Grove Ave.; cost, $5,000.

A. Provost, two-st'y flats, 620 West Taylor St.; cost, $3,500.

F. J. Tobin, two-st'y flats, Sangamon and Sixty-third Sts.; cost, $3,000.

Wm. C. Miller, two-st'y flats, 4039 Washington St.; cost, $2,000.

C. Hase, two-st'y flats, 560 Washington St.; cost, $2,000.

Patrick Coyne, three-st'y flats, 177 West Twenty-second St.; cost, $2,000.

Robert Fitzgerald, two-st'y flats, Winter and Forty-fourth St.; cost, $2,600.

E. Howley, two-st'y flats, 682 West Erie St.; cost, $2,500.

Mrs. E. Fitzgerald, two-st'y flats, 411 Fourteenth St.; cost, $3,500.

E. F. Cyman, two-st'y flats, May and Sixty-eighth Sts.; cost, $2,000.

Wm. Smillie, two-st'y flats, Drexel Ave. and Sixty-first St.; cost, $4,500.

A. R. Spate, three-st'y flats, 399 West Indiana St.; cost, $5,000.

Jacob Fonda, two-st'y flats, 2970 La Salle St.; cost, $2,500.

H. P. Cummings, two-st'y flats, 5744 Dearborn St.; cost, $2,400.

Jacob Weil, 4 two-st'y flats, Halsted and Fifty-third Sts.; cost, $10,000.

New York, N. Y.—*Ninety-first St.*, s s, 255′ 6″ e Fifth Ave., 2 five-st'y brick flats, tin roofs; cost, $60,000; owner, Adolph Balschun, 120 East Eighty-second St.; architect, Charles Stegmeyer, 306 East Eighty second St.

Forty-seventh St., n s, 125′ w Eighth Ave., five-st'y brick flat, tin roof; cost, $19,000; owner, Michael Duffy, 341 Fifty-eighth St.; architect, G. F. Pelham, 1481 Broadway.

Twenty-sixth St., s s, 150′ e Ninth Ave., five-st'y brick flat, tin roof; cost, $19,000; owner, Edward Sorensen, 505 West Twenty-seventh St.; architect, M. V. B. Ferdon, 272 West Thirty-fourth St.

Ninth Ave., e s, n e cor. Seventy-fourth St., seven-st'y brick flat, tin roof; cost, $125,000; owner, John Conley, 28 West Eighty-fourth St.; architect, G. A. Schellinger, 128 Broadway.

One Hundred and Fifth St., n s, 230′ w Fourth Ave., five-st'y brick flat, tin roof; cost, $20,000; owner, Mary A. Reardon, 169 East One Hundred and Seventeenth St.; architect, Edward Wenz, 1491 Third Ave.

Madison St., Nos. 203-205, five-st'y brick flat, tin roof; cost, $20,000; owner, Morris Jacobson, 172 Henry St.; architect, Fred Ebeling, 3 First Ave.

Tenth Ave., n w cor. Twenty-ninth St., five-st'y brick flat, tin roof; cost, $22,000; owner, Daniel McElhinny, 547 West Fifty-first St.; architects, Thom & Wilson, 1267 Broadway.

One Hundred and Twenty-seventh St., s s, 228′ 10½″ w Third Ave., five-st'y brick flat, tin roof; cost, $24,000; owner, Mary A. Cuff, 2119 Madison Ave.; architect, Andrew Spence, 163 East One Hundred and Twenty-fifth St.

West Thirty-sixth St., Nos. 358-360, 2 five-st'y brick flats, tin roofs; cost, $40,000; owners, Drought & Carew, 508 West Fifty-first St., 249 West Forty-second St.; architect, M. V. B. Ferdon, 272 West Thirty-fourth St.

One Hundred and Sixty-third St., with frontage of about 130 feet on the avenues, five-st'y apartment; owner, Stephen D. Hatch.

CHURCHES.

Baltimore, Md.—Immanuel Baptist congregation will build new edifice, n w cor. St. Paul St. and Boundary Ave., to cost abt. $45,000.

Detroit, Mich.—A. Chapoton, Jr., and Vinton & Co., stone church and chapel, 914 Woodward Ave.; cost, $103,000.

HOUSES.

Allston, Mass.—*Wentworth St.*, double frame dwell., 32′ x 58′; owner, H. K. Appleton, Jr.; architect, Samuel J. Brown, Boston; builder, J. H. McLoud.

Baltimore, Md.—J. P. McGovern, 4 three-st'y brick buildings, w s Aisquith St., n Preston St.

J. Frank Griffin, 7 three-st'y brick buildings, e s Madison Ave., n Prestman St.

David S. Collett, 12 two-st'y brick buildings, w s Calhoun St., n Baker St.

Geo. J. Mohr, three-st'y brick building, s s Calverton Rd., near Hollins St.

Samuel T. Shipley, 7 two-st'y brick buildings, w s Cedar Ave., s Huntington Ave.

F. O. Singer, Jr., 23 two-st'y brick buildings and three-st'y brick building, w s Cedar Ave., n Bay St.

Henry Westfall, 10 two-st'y brick buildings, n s Clement St., e Covington St.

Louis J. Rode, Jr., 11 two-st'y brick building (sq.) s s Eastern Ave., beg. s e cor. Luzerne St., and 3 two-st'y brick buildings (sq.) e s Luzerne St., bet. Canton and Eastern Aves.

Henry Klütter, 7 two-st'y brick buildings, s s O'Donnell St., bet. Potomac and Hair Sts.

W. W. Watts, 10 two-st'y brick buildings, n s O'Donnell St., beg. s e cor. Canton Ave.

C. A. Pindell, 11 three-st'y brick buildings, w s Linden Ave., beg. n w cor. Robert St., and 3 three-st'y brick buildings, n s Robert St., W. Linden Ave.

Jas. W. Lindall, 4 two-st'y brick buildings, n s Hoffman St., e Caroline St., and 2 two-st'y brick buildings, e s Procter Alley, bet. Chase and Biddle Sts.

Geo. W. M. Crook, three-st'y brick building, n s Lexington St., bet. Eutaw and Paca Sts.

Boston, Mass.—*Bay State Rd.*, four-st'y brick dwell., 30′ x 70′; owner and architect, Arthur Little; builders, James Smith and Roberts & Hoar.

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

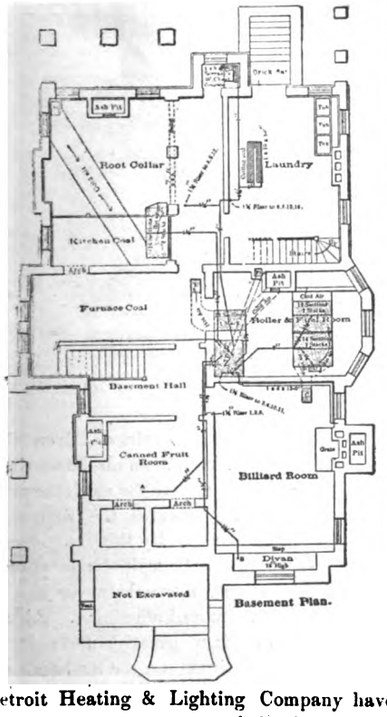
No. 95. SATURDAY, MAY 3, 1890. VOLUME XXVIII. No. 740.

ILLUSTRATIONS.

WROUGHT-IRON WORK. MADE BY THE WILLIAM R. PITT COMPOSITE IRON WORKS, 83 READE STREET, NEW YORK, N. Y.

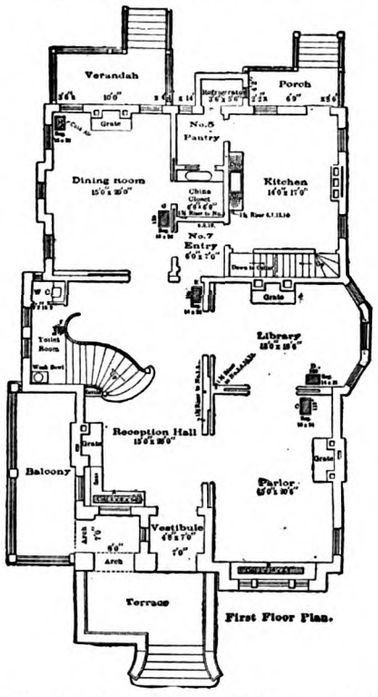
PRACTICAL EXAMPLE OF HOT-WATER HEATING.

In a recent issue of the *American Artisan* — that of October 26 — we gave an extended account of the hot-water method of heating advocated by our friends of the Detroit Heating & Lighting Company, together with a minute description of the admirable Bolton Heater, whereby they carry it into effect. The arguments then elaborated both by the system and the apparatus were those of the manufacturers themselves, but they were set forth in such a temperate and logical manner, and backed by such an array of scientific evidence, as infallibly to have influenced the judgment of all students of the heating problem. It is not unlikely, indeed, that by their mere publication in our columns the



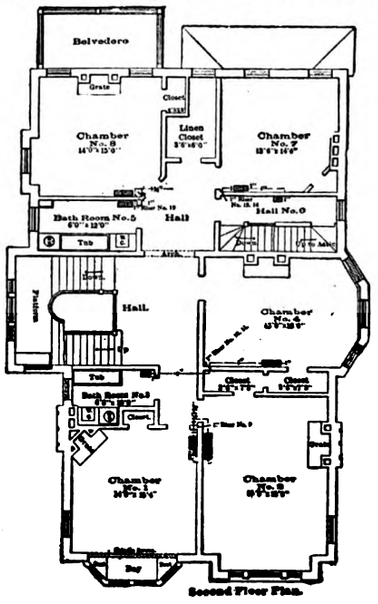
Basement Plan.

Detroit Heating & Lighting Company have made more converts to their theory, and more friends for their Bolton devices, than if we undertook the silly function of bestowing a blue ribbon on them. We prefer to let our readers judge of the systems and inventions by ascertainable facts, and so, to give them a fairer chance on the heating-system under notice, and this from the features of a demonstrated success, we now furnish an account — with explicit plans — of its application in a private residence, of a



First Floor Plan.

gentleman who may be named as one of the largest stove manufacturers in the world, and



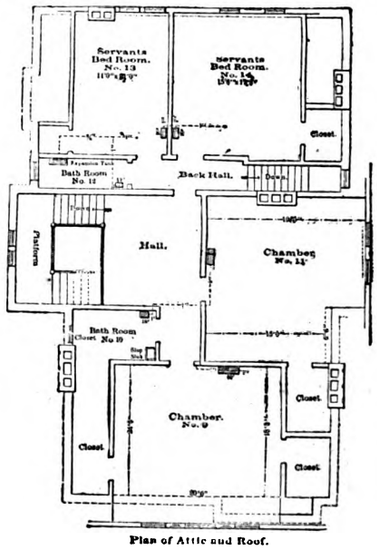
Second Floor Plan.

therefore a most competent judge in the selection of appliances of this very kind. We allude to Jeremiah Dwyer, the well-known president of the Michigan Stove Company, of Detroit, whose house, which is located on Jefferson Avenue, is a handsome brick structure with elaborately carved red sandstone trimmings, the general effect being very rich and pleasing. It is one of the most striking of the many new and costly residences on this fine street, and one of the most elaborately and tastefully furnished houses in the Northwest.

Mr. Dwyer, as a stove man "from way back," looked with suspicion on the new-fangled device for warming houses, but after a great deal of consideration, and, as he says in a recent letter, "after much consultation with his associates," he decided to put in hot water, and we may say he is most enthusiastic over the result of this experiment.

The heater used is a No. 8, two-fire-pot Bolton, located in the "boiler-room" in the basement, as shown on plans.

In the basement the only rooms heated are the billiard-room, in which there is a coil on



Plan of Attic and Roof.

the wall; and the laundry and a closet, heated by coils suspended from the ceiling.

The cold room in the basement receives air from out of doors which is passed over the indirect radiators and warmed on its way to the registers in the first floor. The air-supply can be regulated according to the weather outside, but always affords an ample supply of fresh, pure air to the rooms above.

On the first floor the radiation is almost entirely indirect, the warmed air being admitted through electro-bronze registers of Moorish design. The direct radiation on this

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floor consists of two coils placed under the window seats of the reception-hall and parlor. That in the parlor, on account of the lowness of the window seat, had to be sunk several inches below the level of the floor. Both coils are concealed by antique brass screens.

The second and third floors are heated by direct radiation, the "Perfection" ornamental cast-iron radiator — also recently described in the *American Artisan* — being used throughout. In the bath-room on the third floor is the expansion tank, which is always open to the atmosphere, so that there is never any pressure upon the pipes, except the weight of the water which they contain, and therefore no possibility of explosion.

The plans show the locations of all registers and radiators, as well as of the pipes leading to them. The risers are marked with their diameters, and with numbers indicating the radiators which they supply. Lines of exposed pipe are shown by solid lines leading from the heater, and dotted lines show where concealed supply-pipes are run under the floor. Only the flow-pipes are given, as the return-pipes are run, in every case, parallel and close to the flow-pipes. The whole constitutes the perfection of a first-class heating apparatus, highly effective and economical in its operation, and is an interesting example of the methods of modern hot-water engineers.

The apparatus for this work is, as above stated, the well-known Bolton Heater, which has such an excellent record for long and creditable service in the climates of Winnipeg and Montreal. In this country it is manufactured by the Detroit Heating & Lighting Company, and has rapidly attained a wonderful popularity. As a further indication of the extent of the Company's operations it may be stated that they are now putting one of their heaters into the Washington residence of Senator McMillan; one in the remodelled residence of ex-Mayor Wm. G. Thompson, of Detroit, where a $50,000 fire was recently caused by a defective heating-apparatus; one in the Whitney National Bank, at New Orleans; one in the residence of Mr. Jarvis Richards, president of the First National Bank at Chadron, Neb.; and one in the residence of W. W. Spalding, of Duluth, Minn. This also shows the wonderful adaptability of this system of heating to all ranges of climates, from the blizzard region of the Northwest down to the shelterless Western plains and the stormy Southern gulf. — *American Artisan.*

DETROIT HEATING & LIGHTING COMPANY,
300 Lieb Street, Detroit, Michigan.

WROUGHT IRON STAIRS.

The accompanying cut shows some wrought iron stairs which were recently made by us for the Hier Flats at Syracuse, N. Y. They were designed by Archimedes Russel, architect, of that city, and were made with slate treads and brass hand-rail. The construction is particularly strong, and yet ornamental in appearance.

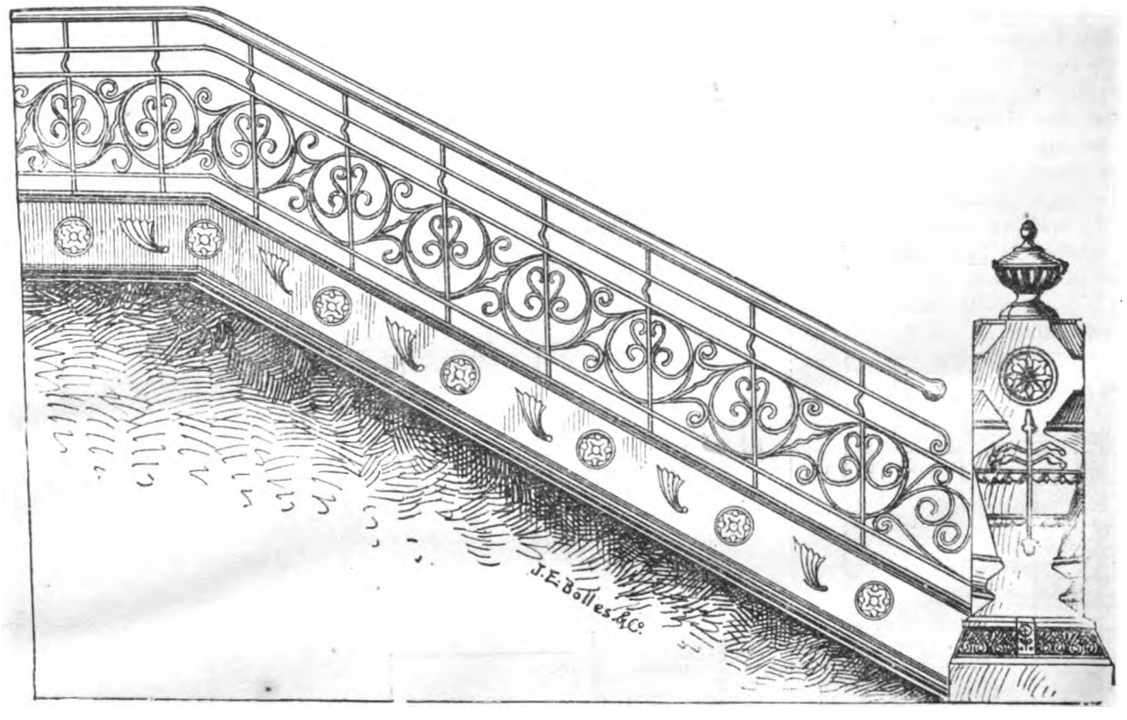
J. E. BOLLES & CO.
Detroit, Mich.

THE AGE OF ALUMINUM.

The promise that aluminum would be the coming metal seems to be in progress of fulfilment. It has had to make its way so far against the prejudices and conservatism of those who are slow to recognize the value of anything new, and against the high price of the product due to the heavy expenses connected with the earlier processes of production. The conservative spirit still exists, to a degree, but the developments in the process of manufacture have been such that, whereas two or three years ago the price of the metal was $12 a pound, it is now $1.50 to $2. To the developments alone is due this remarkable reduction in price. About 8,000 pounds a month of the metal itself or an alloy of aluminum with other metals are now being made and sold in the United States. The amount of sales is increasing, too, at a rapid rate, and at the prevailing low prices an aluminum boom, as it were, may be expected in a few years as the new metal becomes better known and is adapted in actual practice to the manifold uses it is destined to serve.

The history of this industry, in which the late Edwin Cowles, editor of the *Leader* and president of the Cowles Electric Smelting Company, took such an important part, together with his sons, Eugene and Alfred H., is extremely interesting. Through them was introduced the method invented by the Cowles brothers for extracting the metal aluminum and other rare metals from their compounds and producing alloys.

Aluminum is a white metal of bluish tint, and of about the density of chalk. It is about as strong as copper, but the same volume, owing to its density, would weigh about one-fourth as much as copper. It is the metallic base of our ordinary clay, found everywhere, of feldspar, and slate, and is a component of about half the minerals. So it is that, could this metal be cheaply extracted, its source of supply would be inexhaustible. Its properties are such that it is truly a noble metal, having all the properties, excepting weight, of such metals as gold and silver, and in addition, the properties of the more common metals, such as copper and zinc. Deville well named it "silver from clay," at the Paris Exposition of 1855. It is almost safe to say that, alloyed with other metals, a small percentage of aluminum, added to any ordinary alloy, will improve its qualities, rendering it stronger, less tarnishable, and more easily cast and worked. Within a short time an extensive application has been made in Chicago and elsewhere by adding aluminum to molten steel just before pouring into castings, it having been found that one-tenth of 1 per cent of aluminum so added frees the resultant castings from blow-holes, which have been the one great difficulty in the way of the general application of steel to all forms of castings. Even this small percentage of aluminum also materially lowers the melting point of the steel, thus still further contributing towards the successful making of steel castings. By this same means pure wrought iron can be melted and poured into ductile castings, a result never accomplished without the use of aluminum. Aluminum added to brass greatly increases its strength, and castings can be made almost equaling steel in strength. Aluminum added to pure copper gives a series of alloys which are used as imitations of gold, and the alloy of nine parts copper and one part aluminum is the strongest known copper alloy. With manganese, copper and aluminum are secured some beautiful white alloys, superior to the nickel silver made from nickel, copper, and zinc. In many other combinations aluminum



Wrought-iron Stairs.

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is giving results that are entirely unlooked for and new to the arts.

In 1885, at the meeting at Ann Arbor, of the American Association for the Advancement of Science, the Cowles brothers first made public a description of their electric furnace, wherein they had succeeded in reducing aluminum and other rare metals and producing alloys by a method cheaper by far than had ever been done before. This process is carried on in a carbon-lined chamber, with air excluded to prevent the carbon from burning. The furnace is heated by powerful electric currents. The temperature attainable, unlike that in ordinary fiery furnaces, is practically unlimited, and every compound that goes into the furnace must suffer decomposition. The results possible with this furnace are almost without number.

The discovery of this novel process and the possible cheapening of the products, including aluminum alloys, immediately gave an impetus to the investigation of methods of separating aluminum by means of electricity. The Cowles brothers established a large plant at Lockport, N. Y., where they have since steadily employed some of the largest dynamos the world has ever seen.

Within the last year and a half, C. F. Hall, an Oberlin student, who, through the development of the Cowles process, became interested in the subject of aluminum, started the Pittsburgh Reduction Company. As the Cowles boys had made their first experiments with a piece of a chimney flue and a borrowed current of electricity from the Brush lighting station in Cleveland, so Hall secured his first aluminum in an oyster can. The Hall and the Cowles processes, which may be said to be modifications of one process, both the products of Western Reserve brains, have inaugurated the aluminum age, At the last meeting of the American Institute of Mining Engineers at Washington, D. C., an entire session was devoted to the consideration of this topic, and eight or ten valuable papers were read. The so-called Herault process from Neuenhausen, Switzerland, was described, but it seemed to be the unanimous opinion that it was nothing more than the Cowles process in a foreign land where no patent laws existed. Professor T. Sterry Hunt, of McGill University, recently said: "The importance of this new instrument, which the Messrs. Cowles have placed in the hands of chemists for producing and controlling degrees of temperature never before attained can scarcely be estimated, either in its economic or scientific aspect. The heat of this furnace realizes the dream of the alkahest, or universal solvent of the alchemists.

THE COWLES ELECTRIC SMELTING AND ALUMINUM CO.,
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NOTICE OF REMOVAL.

WE beg to inform our friends and patrons that owing to urgent need of more room we have just removed to 195 & 197 Fulton Street, three doors west of Church Street, where we will carry in stock a full line of speaking-tubes, whistles, electric, mechanical and pneumatic bells, annunciators, and general bell-hangers' supplies. Thanking you for past favors, and soliciting further patronage, we are,

Yours respectfully,
W. R. OSTRANDER & CO.,
195 & 197 FULTON STREET, NEW YORK.

NOTES.

THE Springfield Foundry Company of Springfield, Mass., builders of elevators, have recently put in for the elegant new hotel in Schenectady, N. Y., "The Edison," one of their Atlas hydraulic elevators, with quartered oak car, fitted with bevelled plate mirrors, plush seat, annunciator and electrolier. This style of elevator shows a very large percentage of efficiency for the amount of water used, or from 75 to 80 per cent. This is equal to the efficiency of the Direct-Lift or Hydraulic-Plunger elevator which has always been considered more powerful than any form of horizontal elevator engine: but since the introduction of the Atlas this is no longer true.

WHAT is blackening of shingle work?

The question is often asked whether creosote preserves the color as well as the wood when used as an exterior stain. There seems to be no doubt that it does so. Probably the reason is that the lower forms of organism and fungi, which are so fruitful in causing the blackening in oil paint and stains, are prevented by the addition of creosote, which is a strong germicide.

THE Whittier Machine Company have recently constructed for the Newton & Watertown Gas Company for their works in Newton, Mass., three horizontal steel boilers, each six feet in diameter. Also for the Providence Dyeing, Bleaching & Calendering Company, of Providence, R. I., two horizontal steel boilers each six feet in diameter, and have put into the Massachusetts School for Feebleminded and Idiotic Children, at Waltham, Mass., a complete steam-heating apparatus, including three of their steel boilers.

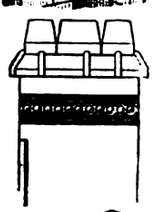
THE Springfield Foundry Company of Springfield, Mass., have recently placed in Cooley's Hotel in Springfield, one of their Titan hydraulic-plunger elevators, this being the third of this style of elevator in the hotel. Cooley & Company say they have not spent five dollars in repairs on the first of their plunger elevators, which has been in constant use for ten years. They naturally consider it superior in durability, simplicity and safety to any other style of elevator. Also for the Rockville (Conn.) Gas Light Company one of their Titan hydraulic-plunger elevators for the purpose of raising coal to the charging door of the water-gas generator. For all purposes of this sort there is nothing more compact, convenient and satisfactory than the Titan plunger elevator.

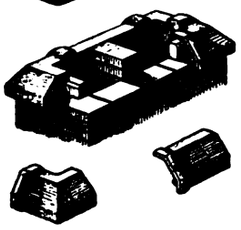
THE Whittier Machine Company have recently put into the building corner of Broadway and Fulton Street, New York City, for John Duncan's Sons, an hydraulic elevator for passenger service operated upon the Pressure-Tank system. They have also put into the Central Block at Lowell, Mass., two hydraulic elevators, one for passenger and one for freight service.

THE Globe Ventilator Company report the sale of 6 36-inch ventilators to the Apollo Iron and Steel Company at Pittsburgh, Pa., for ventilating the galvanizing room.

THE HANSEN

SALT-GLAZED TERRA-COTTA WEATHER-PROTECTING CHIMNEY TOPPING.





(Patented in the United States and Canada).

Indorsed by Architects throughout the country; are mainly designed to replace the common brick corbeled chimney top; for the **PROPER PROTECTION** of chimney masonry from the usual **EARLY DESTRUCTION** of same by the action of rain and frost. These toppings are manufactured by steam press and dies, same as first-class salt-glazed sewer pipe, for keeping in stock in same manner, and as made in pieces (see diagrams) present the **CHEAPEST, MOST PRACTICAL** ever **READY** and **LASTING** material for bricklayers' use in topping out chimneys. Deducting value of mason's material and time saved when using these toppings, their **COST PER FLUE** does not exceed **50 TO 60 CENTS** that of common brick tops, which secures absolutely **PERMANENT** chimney masonry, and saves annoyance and **REPAIR EXPENSES**, the usual and too frequent experience of owners. - - - - Jan. 1890.

HARALD M. HANSEN,

—PATENTEE,—

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Something New for the Stable.

Read's Patent Harness Bracket.

An Article long wanted but never before made.

Holds the whole harness, takes no more room than the ordinary hook or peg, can be used for both single and double harness. Gives the harness-case a neat appearance, as it carries the harness up uniformly in width with the saddle, beside keeping the bridle and breastplate in their proper shape. They are neatly japanned, with gilt facings. Price $18 per dozen. Are now in use in over 100 first-class private stables in and about Boston.

Each bracket lettered "J. J. Read, Boston, Mass." For sale by dealers everywhere.

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The public are cautioned against all similar brackets, not marked with my stamp, as such brackets are infringements of patents held by me.

Also cedar-top riding-saddle bracket. Price $3.50 each. And whip-rack for English coach and straight whip combined. Price 50 cents each.

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Vineyards, Plantations and large unimproved tracts of land for Colonies.

Southern Village, comprising Cotton Mill 100 x 60, 3 stories, capacity 5000 spindles; warehouses, store, cotton gin, flouring, grist and saw mills, president's and superintendent's residences, 35 houses, 3 stables, and 288 acres land, now doing profitable business. Price $25,000. $5,000 cash, balance in annual payments.

A Palatial Southern Home. In famous Nacoochee Valley, fine house and out-buildings upon which more than $75,000 has been expended, 2,500 acres, adjoining a gold mine with capitalization of $2,000,000, the same vein extends through this estate. Price $28,000, including blooded stock, machinery, etc. Apply to Capt. J. H. Nichols, Nacoochee, Ga. or to Geo. H Chapin.

"Grand View Hotel" with 3,000 acres at Tallulah Falls, the "Niagara of the South," valuable gold deposits, over a mile of water-power, one of the best localites for an industrial town in the South. Price $85,000, easy terms. Apply to W. D. Young, Tallulah Falls, Ga., or to Geo. H. Chapin.

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A Street Railway in prosperous city that has doubled its population during last 5 years. Price $10,000. Will sell whole, half or quarter interest.

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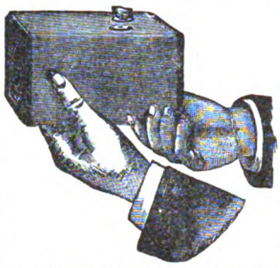
257 Washington St., Boston; 36 Pine St., New York; 5 and 6 Palace Chambers Bridge St., Westminster S., W. London; 48 Main St., Greenville, S. C.

New Kodak Cameras.



"YOU PUSH THE BUTTON, WE DO THE REST,"

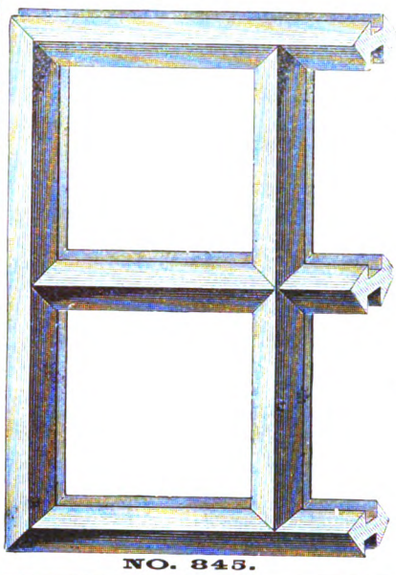
(OR YOU CAN DO IT YOURSELF.)

Seven New Styles and Sizes All Loaded with Transparent Films.

The attention of Architects, Engineers, Manufacturers, Builders, Railroad men, Jewelers, Miners, Machinists, Printers is invited to the Kodak as the means of obtaining an instantaneous photographic picture of any article whose form it is desired to either carry with you or send to distant points. Without any knowledge of photography any man can take instantaneous pictures of any article that has form or can be photographed.

Education in photography is absolutely unnecessary and a child of ten can work the Kodak Cameras. The efficacy of this for all men in any line of manufacturers or trade will be recognized at sight. For sale by all Photo. Stock Dealers. For full particulars and Catalogue, address

THE EASTMAN COMPANY, Rochester, N. Y.



NO. 845.

BRASS SASH MOULDING.

Brass Sash Moulding for Bevel Glass is used for panes from 2 to 12 inches square, or any size of glass not greatly exceeding these dimensions.

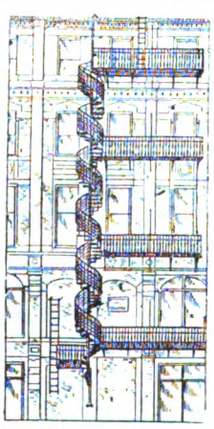
Is used for Screens, Partitions and Windows in Dwellings, Banks and Public Buildings.

Is strong for the purpose of its use, is highly finished, and gives a rich mediæval appearance to place where applied.

Other sizes and shapes made to order.

J. B. SHANNON & SONS,
1020 Market St.,
PHILADELPHIA.

BURDITT & WILLIAMS,
ESTABLISHED 1860.
Manufacturers and Dealers in
FINE HARDWARE
FOR
Dwelling-Houses, Churches, Stores and Public Buildings.
Every Excellence of Mechanism. Latest and most approved Styles and Finish.
Special New Designs of Knobs in Cut-Glass. Patterns made to order from Architect's Designs. Estimates made. Contracts filled in all Markets.
20 DOCK SQUARE, BOSTON. BRANCH OFFICE: 1421 G. St., N. W., Washington, D. C.
Our Hardware may be found in important buildings in the leading cities of the Country.



THE MARSHALL FIRE ESCAPE. (Patented.)

ESTABLISHED 1818.

MARSHALL BROTHERS,

Iron City Elevator Works

69 TO 75 DIAMOND ST., PITTSBURGH, PA.

The Marshall Positive Safety Passenger and Freight ELEVATORS,

Hydraulic, Steam, Electric and Hand-Power.

SPIRAL STAIRWAY FIRE ESCAPES, WITH and WITHOUT STAND-PIPE,

For Asylums, Hotels, Schools and Public Buildings.

SEND FOR CIRCULAR.

ATLANTIC WHITE-LEAD & LINSEED-OIL CO.,

"ATLANTIC" PURE WHITE LEAD,

—AND—

Pure Linseed-Oil,

Raw Refined and Boiled.

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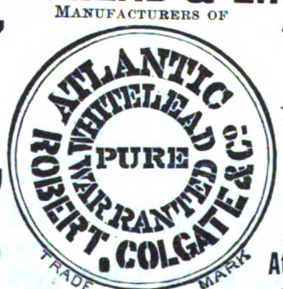

The best and most reliable White-Lead made,

And unequaled for Uniform Whiteness, Fineness, and Body.

ADDRESS,

Atlantic W. Lead & Lin. Oil Co.
287 Pearl St., NEW YORK.

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AMERICAN ARCHITECT AND BUILDING NEWS

ADVERTISERS' TRADE SUPPLEMENT.

No. 96. SATURDAY, JUNE 7, 1890. VOLUME XXVIII. No. 754.

THE ECONOMY HOT-WATER COMBINATION HEATER.

To meet a demand from certain sections for a heater to carry hot-water radiation, Mr. Pease has recently invented the heater which is here illustrated. A number of them have been set, and we believe that Mr. Pease "builded better than he knew." The heater has the advantage of possessing a thoroughly tested construction of one of the heaters which we have been successfully manufacturing during the past ten years. Although it is young it has a sturdy ancestry, and we believe our success in the manufacture of sanitary heating-apparatus will be a sufficient guarantee for its future success.

This heater is cylindrical in shape and of about the same construction as our Low Down Combination Steam and Warm-Air Heater.

The Bottom, *Z*; Ash Pit, *K*; Fire Pot, *L*; Combustion Chamber, *S S*; Feed Chute, *F*; Dust Damper, *I*; and Double Casing, *T*; are the same as those used in the construction of the heater above mentioned.

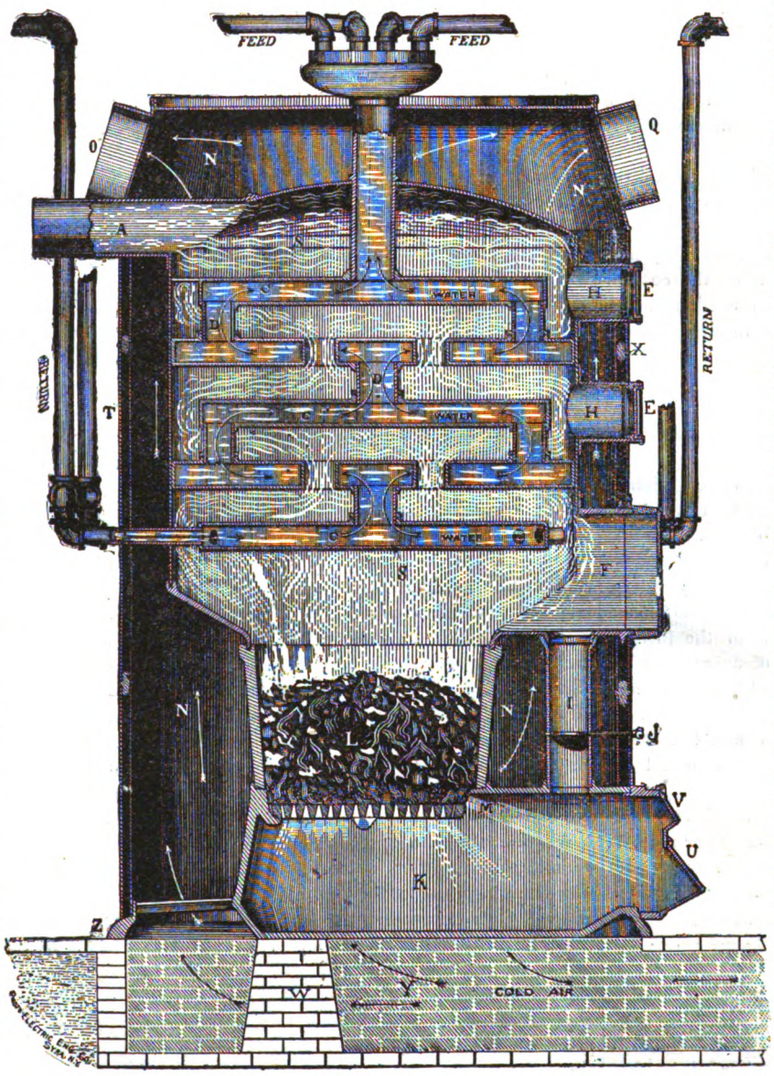
The Hot-Water Chambers, *C C C*, are flat and round, made of heavy cast-iron (2-inch interior vertical diameter), and are connected to one another by the upright connections, *D D D*. These connections are screwed into shoulders on the chambers and are lock-nutted thereto over asbestos and lead-filled cup joints.

These chambers are suspended inside of the combustion chamber in such a manner as not to impair the draught, but to retard the exit of the products of combustion until the heat is entirely yielded. The fire exposure is as nearly uniform as it is possible to obtain, and inasmuch as each alternate section extends from side to side of the combustion chamber, the product of combustion is forced to traverse over the entire top and bottom surface of each section.

The heated gases and smoke ascend alternately around the sides of the smaller chambers and through four flues near the centre of each of the larger sections until the exit flue *A* is reached where they pass into the smoke pipe several degrees cooler than from any other hot-water heater made.

In this heater the water circulation is positive and continuous. The returns may enter the lower chamber on any side of the heater which may be most convenient, and the water circulates upward through every portion of the interior of each chamber before reaching the distributing feed pipe, passing as many times *over the fire* as there are sections used.

The primary advantage embodied in this heater is one which has been a large element in making a popular reputation for our Combination Steam and Warm-Air Heater, and that is a *Double Capacity* for producing *Direct* and *Indirect Heat*.



The Direct Heat is produced by taking the air from the outside through the cold air duct *Y*, passing it through the air-heating chamber *NNNN* in the same manner as by a Warm-Air Furnace. The air is properly heated, moistened by water evaporation (from a vapor-pan not shown in cut), and is distributed through the warm-air pipe *OO* to the registers in the principal apartments nearest to the heater.

The Direct Hot-Water Radiation is obtained by a continuous circulation of water which passes into the lower chamber *C*, and then on being heated passes up through each of the corresponding sections and through the feed-pipes to the radiators where the heated-water radiates its heat and by natural gravity returns to the lower section of the heater.

It is from a knowledge of the fact that our *Combination Systems* of heating provide a means for perfect ventilation, that we are enabled to claim for this heater a decided superiority over any All-Hot-Water Heater.

Where proper exit ventilation is provided, as a natural consequence our Combination Hot-Water System ensures a circulation of

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fresh warm air throughout the building. We believe that the atmospheric condition of a house heated by our Combination Heater is greatly superior to that of a building heated by direct hot-water radiation only. The latter system provides no means for furnishing a fresh air supply; it simply heats the air in each room many times over. It is a well recognized fact that such methods of heating exhaust the oxygen and renders the air impure and unhealthful.

There are two features in the ordinary All-Hot-Water Systems of heating which form important objections to such methods. We assume and believe that separate indirect radiation with an all hot-water plant is impracticable, and hence we draw our comparisons with the direct system.

The first of the objections mentioned is the acknowledged fact that to secure the same amount of heat that can be obtained from a given amount of steam radiation, an increased amount of radiating-surface is required — usually from 50 to 75 per cent more. This necessity naturally adds a large amount to the first cost of the plant, to make no mention of the larger space occupied by the radiators.

The second objection is, that with Direct All-Hot-Water Systems there is, more frequently than otherwise, a necessity of locating the direct radiators in the most conspicuous places in the first floor rooms, where they invariably conflict with other and more ornamental articles of furniture. This is an objection to which the house-wife never becomes reconciled.

In the use of our Combination System of hot-water heating these objections are entirely eliminated:

Because — the indirect heat from the furnace proper is passed up into the rooms through registers sunk in the floor, obviating the necessity of direct radiators in the principal rooms, and naturally making the cost far less for our system than for a plant which would necessitate from 40 to 60 per cent more radiating surface.

We will bring our argument down to a practical application, and cite some figures which we believe any heating engineer will consider equitable. For example: given to heat, a library of 20 x 20 feet, 10 feet high — 4,000 cubic feet. Figuring close and assuming that the room is well protected, it would require at least 100 feet of direct hot-water radiation. This, with the necessary valves, would cost the purchaser from $40.00 to $45.00. To heat the same space from the furnace proper, a 13-inch tin pipe of average length and a 12 x 19 nickel-plated register and border, with box, etc., would be necessary, the cost of which to purchaser would be from $10.00 to $12.00. (This cost would be lessened even more by using Japanned registers.) We submit that it is fair to state that a minimum saving of $30.00 per room is guaranteed for every room heated by indirect heat in the use of our system.

J. F. PEASE FURNACE CO.,
SYRACUSE, N. Y.

FIREPROOF BUILDING BRICK, TILES AND ENAMELLED BRICK.

Perhaps no enterprise in New England is so little known to the general public as that devoted to fire-brick making as carried on by the Somerset Potters Works Company at Somerset, Mass.

The attention of architects, builders and owners is invited to this industry both on account of its indispensable nature and its usefulness. It has been carried on for over half a century, but it is only since Messrs. Sanford assumed control of the business that extensive improvements have been made. The works are located on the banks of the Taunton river, nearly opposite Fall River, and comprise a continuation of buildings all utilized in the industry and covering an area of about one acre.

Last fall we made great improvements, by which the capacity of the works were greatly increased, adding patent fire-brick machinery imported from England, which is acknowledged to be superior to anything ever invented for this particular work, and especially adapted to the working of Jersey clay, and of which this company has the exclusive control for the United States and Canada. It has a capacity of from 10,000 to 12,000 brick daily. A new steam-engine of the Lovegrove & Company's make was also put in, with a 100 horse-power boiler, the engine of nearly like capacity. In fact, the equipment of machinery now represents everything calculated to improve production.

Attention is also called to the new Hoffman kilns for burning enamelled, fireproof building and fire-brick, with a capacity of about 80,000 bricks. We have every facility for quick shipments. During the coming season the leading specialty is to be patent *glazed enamelled fireproof building brick*, we having engaged the services of competent men to take charge of this branch of the business. We are prepared to furnish building tiles of a superior quality for plain or arch work. Large storage facilities have been secured on Constitution Wharf, Boston, for the accomodation of our eastern patrons, besides which a full line of samples can be found at our Boston office, 4 Liberty Square.

SOMERSET POTTERS WORKS CO.,
SOMERSET, MASS.

HOUSE-PAINTING.

At this season of the year, a word of advice to those contemplating painting may not be out of place. Within the past few years there has been so much attention given to tasteful architecture in moderate cost dwellings, that the selection of appropriate shades for decorative painting has come to be a more important question than at any previous period, and the richest shades, if selected with taste, may be used to the greatest advantage. We caution the uninitiated, however, against attempting to choose combinations of deep, rich colors, without first consulting a competent architect or some reliable paint manufacturer. The H. W. Johns Manufacturing Company, of New York, make a specialty of designing combinations of harmonious shades for their customers. This they do, free of charge, on receipt of photograph or architect's plan of the building to be painted.

A point we cannot too strongly impress upon the minds of our readers is the importance of using none but the best. The question of quality should receive the first consideration, and in estimating price it should be remembered that it is questionable economy to expend from fifty to one hundred dollars in applying twenty-five dollars' worth of inferior paint which will never have a satisfactory appearance, and will wear, at most, but two or three years, when the use of a strictly first-class article, costing, say 20 per cent more (or five or six dollars for an ordinary house), would insure a serviceable and much more pleasing result for at least two or three times as long, The H. W. Johns Manufacturing Company are manufacturers of first-class, strictly pure linseed oil paints, and their reputation as a reliable house, well-known in business circles for many years, should give weight to any claims they make for their goods. If any information is desired regarding quantity of paints required, or any other special points, they will cheerfully answer any questions addressed to their office, 87 Maiden Lane, New York.

THE H. W. JOHNS MANUFACTURING CO.
87 MAIDEN LANE, NEW YORK.

"THE GREAT CHURCH LIGHT."

The patent reflectors and reflecting chandeliers manufactured by Mr. I. P. Frink, New York, are now being introduced in the following prominent churches:—

First Presbyterian Church, Woodhaven, N. Y.; Ocean Hill Baptist Church, Brooklyn, N. Y.; First Universalist Church, Putnam, Conn.; Grove Street Congregational Church, East Orange, N. J.; First Welch Presbyterian Church, Wilkes Barre, Pa.; Second German Baptist Church, New York; Roseville M. E. Church, Newark, N. J.; Sunday School Room of Tompkins Avenue Congregational Church, Brooklyn, N. Y.; Mt. Pleasant Baptist Church, Newark, N. J.; Foster Street Lutheran Church, Harrisburg, Pa.; St. James M. E. Church, Galveston, Tex.; Tacoma Presbyterian Church, Tacoma, Wash.; Trinity P. E. Church, New York; House of Prayer, Germantown, Pa.; First M. E. Church, Havana, Ills.; Union Station M. E. Church, Richmond, Va.; Greeneville Reformed Church, Greeneville, N. J.; Sands Street M. E. Church, Brooklyn, N. Y.; Fifth Street M. E. Church, South Wilmington, N. C.; Clinton Avenue Reformed Church, Newark, N. J.

I. P. FRINK,
551 PEARL ST., NEW YORK.

THE RIDGWAY REVOLVING OPEN FIRE-POT FURNACE.

There has been in furnaces generally only two kinds of Fire-Pots; one of them is the Solid Cast-Iron Pot, in which it is difficult to maintain slow combustion any length of time without losing the fire. The other is the Brick-Lined Fire-Pot, which lacks heating-power from the fact that the brick are non-conductors of heat and keep the heat from the radiators, get broken and need replacing frequently, and sometimes become covered several inches thick with clinkers, thereby reducing the size of the fire-pot.

The Ridgway Revolving Open Fire-Pot embraces improvements which overcome the defects of both the Cast-Iron and the Brick-Lined Pots, and maintains and excels all the advantages of the two.

With the use of the Revolving Open Fire-Pot the entire surface of radiator is utilized by the direct radiation from the sides of burning fuel, as well as from the top, for the products of combustion not only pass upwardly but outwardly through the open spaces in the sides of the fire-pot, which ensures more complete combustion, burning the gases near the radiator, thereby utilizing them to the greatest extent, preventing explosions which are likely to occur in furnaces that are constructed with flues carrying the draught below the fire-pot and around the base.

The construction is very simple, any of the working parts can be removed or replaced without taking the furnace down or disturbing the hot-air pipes. The revolving attachments are strong and simple.

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Sifting ashes, with attendant fatigue and clouds of dust, is rendered unnecessary. Little strength is required to manage the furnaces, and stooping over to shake them is unnecessary.

Reliable Automatic Regulators control the fire, giving a uniform temperature, preventing excessive heat in mild days, but permitting abundant warmth when zero weather requires it.

of expansion and contraction without warping or cracking, as is the result where Fire-Pots are made in one solid piece.

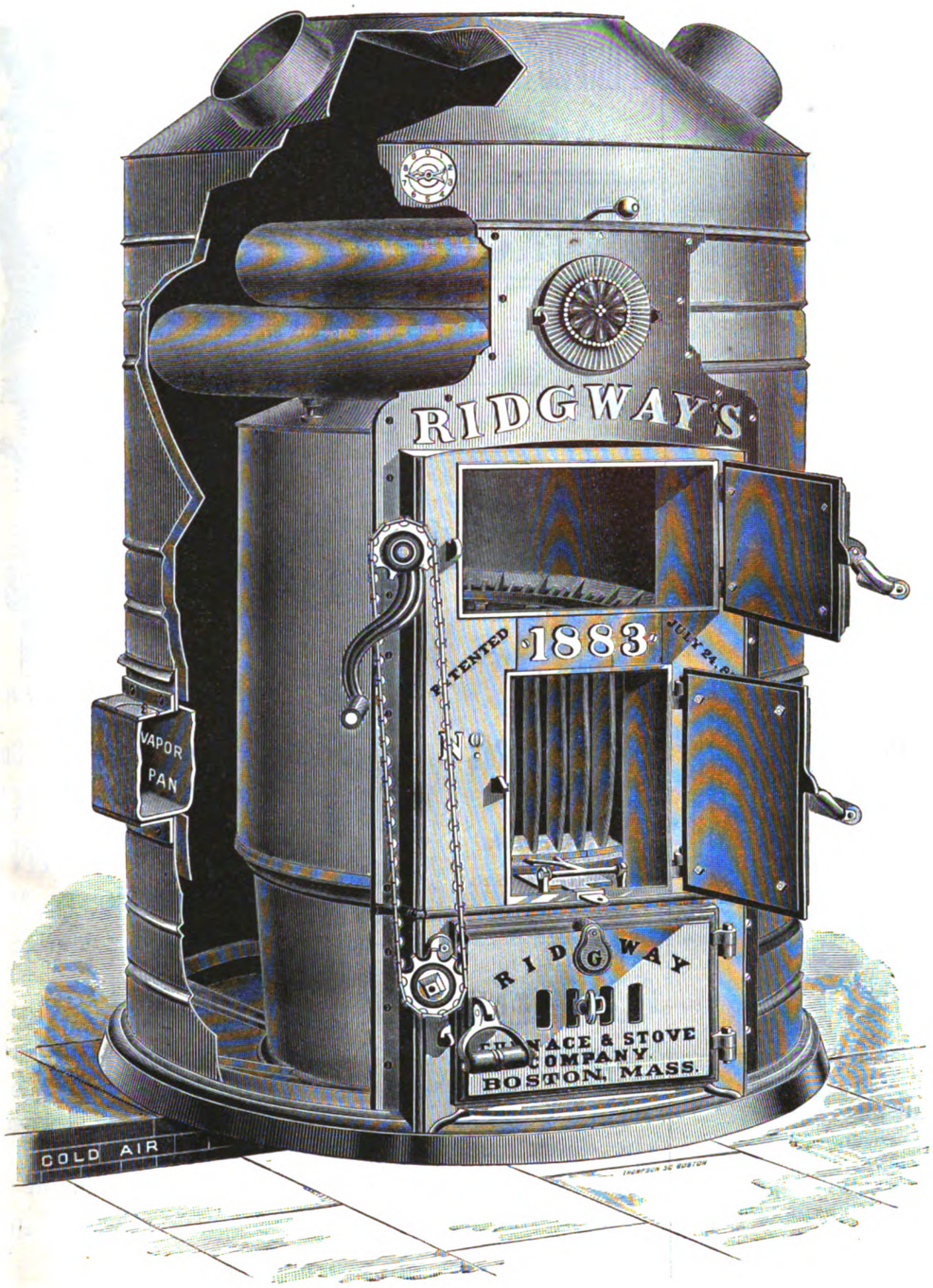
There is no sifting of ashes, as the combustion of the fuel is complete.

The construction of the Open Fire-Pot ensures a naturally perfect combustion, which is impossible to obtain by any other method.

In running a low fire the Pot is superior to all others, as cold air does not come in contact with it, chilling it and causing the fire to deaden on outer edges.

There is no firebrick between the fire and the radiator to obstruct the passage of heat.

The Fire-Pot being open (on the sides) the condition of the fire can be seen at a glance, and access had to every part of it.



It must not be expected that these furnaces will require neither care nor fuel, but when properly placed and intelligently managed they will give, with the same amount of coal, more heat, with no gas in rooms heated, and with no clinkers in the furnace, with less expenditure of time, patience and strength, than any other furnace in the market.

We claim great durability for our Fire-Pots, for those which have been in use six and seven years, with no repairs, are as perfect as when they were set, and we will warrant them (with reasonable usage) five years.

The points of advantage to be found in the Ridgway Furnace are as follows:

The Fire-Pot being made in sections, allows

The combustion is so perfect that we have no clinkers and no gas.

The gases are burned on the sides of the Pot near the Radiator, as well as on the top.

By revolving the Fire-Pot the ashes are shaken out without packing the coal, as is the case with the old method of shaking the grate, which necessitates the use of the poker through the grate to loosen it so the air can pass through to support combustion.

The putting on of fresh coal does not retard or smother the fire, as it burns out through the sides of the Pot gradually igniting the fresh coal, and consuming the gases as fast as generated, thereby saving a great waste of gas and the cooling of the furnace.

In our Portable Furnaces the casing has a tin lining.

We furnish an Automatic Regulator with every furnace so sensitive that closing the registers will check the draught.

RIDGWAY FURNACE COMPANY,
CHAS. L. RIDGWAY, General Manager,
7 PORTLAND STREET, BOSTON, MASS.

THE Whittier Machine Company have recently put into the Office Building at 43-45 West Street, Boston, an elevator for passenger service operated by their Hydro-Electric Pressure-Tank System.

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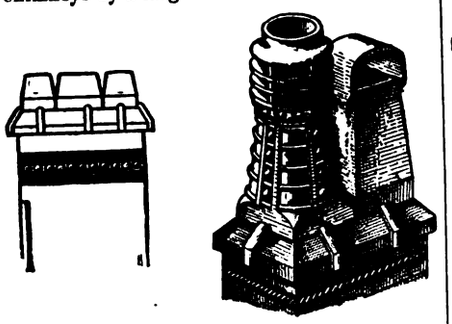
A SUBSTANTIAL CHIMNEY TOPPING.

As a protection against the early destruction of the tops of chimneys by rain and frost, the Hansen patent saltglazed chimney top, a device patented by a Chicago architect, seems to meet with general approval, its use demonstrating just what was claimed when the device was put upon the market and applied to chimneys by a large number of builders. The



success in introducing it already achieved by the agent, Mr. William M. Dee, 165 East Adams Street, Chicago, is because of the simplicity in principle and undoubted substantial character of the material of which it is made and the praise bestowed upon it by those who have given the device a trial. These toppings are almost as cheap as common brick toppings, and should be used generally for permanent work, — repairs as well as in new work.

HARALD M. HANSEN,
88 La Salle St., Chicago, Ill.

The Whittier Machine Company have recently put in hydraulic elevators for passenger service operated upon the Pressure-Tank System in the following buildings:—

The building of Messrs. R. & O. Goelet, on the corner of Fifth Avenue and 37th Street, New York, one. The Stevens Building, 16 & 18 Wall Street, New York City, two. The Wilks Building, corner of Wall and Broad Streets, New York City, two.

CATALOGUES AND CIRCULARS WANTED.

Advertisers in this journal are requested to send their circulars, catalogues, price-lists and samples of building materials to

E. HILL TURNOCK,
Room 23, 151 and 153 Monroe St., Chicago, Ill.
And to
W. TUFF MEREDITH, Seattle, Wash.

AN ENDORSEMENT FROM A CONNOISSEUR IN COLORS.

New York, April 29, 1890.

Messrs. Dexter Bros., Boston, Mass.

Dear Sirs; — Such use as we have made of Dexter Brothers English Stain has proved entirely satisfactory. Respectfully,

The Tiffany Glass Co.

May 22, 1890.

Please ship to Louis C. Tiffany, Cold Spring, Long Island, New York, one-half barrel shingle stain No. 4.

The Tiffany Glass Co.

NOTES.

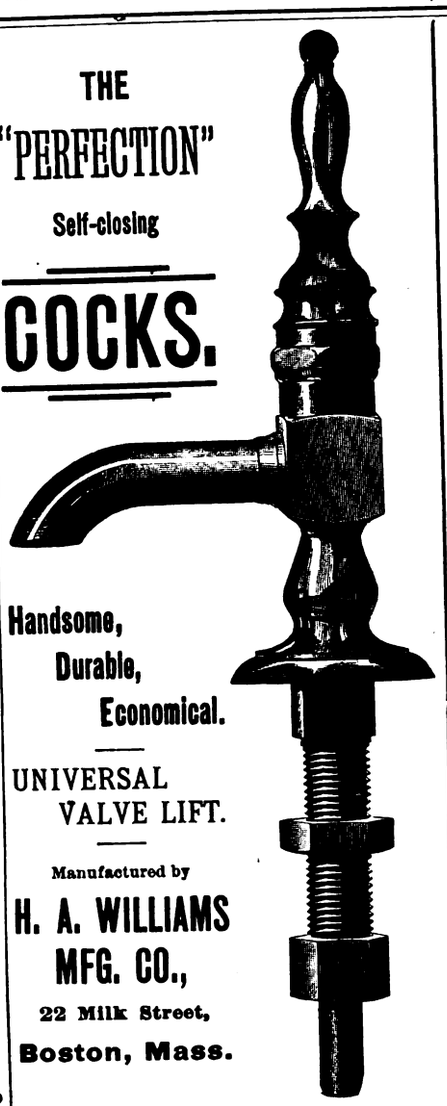
The Whittier Machine Company have recently completed putting into the De Soto Hotel at Savannah, Georgia, the elevator system and a complete steam-heating and ventilating apparatus.

The Columbia Rubber Company are very much pleased with their recent escape from fire. A lot of combustible material caught fire in a building which they had protected with a fireproof coating called anti-Pyre, made by the manufacturer of Creosote Stains, Samuel Cabot, of Boston.

The building was not injured in the least. What makes the case more striking was that under the edge of the roof the whitewash brush had not been small enough to apply the anti-Pyre, and the result there was that all along this narrow slit the fire had charred and even burned holes in the unprotected wood, while the anti-Pyred surface was uninjured, although more exposed.

The Whittier Machine Company have recently put into the apartment-house of Silas W. Merrill, on Blackburn Street, Boston, a complete steam-heating apparatus, together with an hydraulic elevator for passenger service.

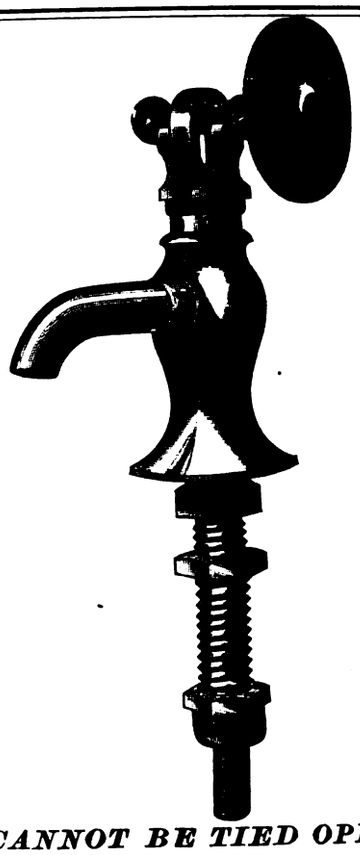
THE
"PERFECTION"
Self-closing
COCKS.



Handsome,
Durable,
Economical.

UNIVERSAL
VALVE LIFT.

Manufactured by
H. A. WILLIAMS
MFG. CO.,
22 Milk Street,
Boston, Mass.



CANNOT BE TIED OPEN.

Broughton's Patent Self-Closing
WHEEL HANDLE
BASIN COCK.
Stebbins Mfg. Co., SPRINGFIELD, MASS.
SOLE MANUFACTURERS.

Climax RAIL for Sliding Doors. The only patent floor rail on the market. Greatly improved and better than ever. Used by all the leading Architects and Builders in the country for the last five years and gives general satisfaction. It is level with the floor The doors cannot **jump** the track. Can be put in old houses as well as new, without disturbing paint or casing

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ENAMELLED FRENCH BATHS
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— AND —
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